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ARTICLE I.

ARTISTIC ANATOMY AND THE SCIENCES USEFUL TO THE ARTIST. Opening Lecture of a Course Delivered at the Winter Term, 1883, by S. V. CLEVENGER, A.M., M.D., Professor of Artistic Anatomy, Art Institute, Chicago.

One of the best things Sir Joshua Reynolds ever said was: "A painter stands in need of more knowledge than is to be picked off his palette, or collected by looking on his model, whether it be in life or in picture. He can never be a great artist who is grossly illiterate." * After mentioning the advisability of being conversant with the poets, "that he may imbibe a poetical spirit," the recommendation is made to study that "philosophy which gives an insight into human nature, and relates to the manners, character, passions and affections." "The

* Reynolds' Seventh Discourse Delivered to the Students of the Royal Academy, December 10, 1776.

artist," said Sir Joshua, "ought to know something concerning the mind, as well as a great deal concerning the body of man." Admitting all this as self-evident and trite, it is to be observed, that in the days of these utterances, knowledge was not so readily attainable as now, and, with the exception of gross anatomy, which at that time had been thoroughly worked out, there was as much of the false as of the true in the sciences available to the artist; mental science especially.

It is not to be expected that intimacy with the sciences will create an artist, for the artist, like the poet, is *nascitur, non fit*; but certainly the born artist will be all the greater and better for acquired knowledge, as will be the born poet for the mastery of prosody.

If we are to believe Haydon, Sir Joshua was but an indifferent chemist, and knew but little of anatomy. At once the uninformed painter would ask, Why should the artist be familiar with chemistry? All your colors are chemical combinations, which in mixing undergo certain color reactions or changes which are not permanent in all cases; some pigments fade; others darken, and still others pass through a change or many changes. A superficial knowledge of chemistry will enable the modern painter to avoid the errors of the old masters, whose paintings, for the most part, are not now as originally created. I notice a disposition which is to be encouraged, on the part of recent art authors,* to set forth in detail the physics involved in color blending.† While for mere copying or picture-making, a little knowledge of chemistry and physics may answer, in this day, if the painter aspire to represent a modicum of what his art is capable of setting forth by the aid of modern science, were he to attempt a knowledge of mental science, to know the mysteries of the emotions, "manners, characters, passions and affections," nothing short of a good acquaintanceship with physics, chemistry, biology, physiology and anatomy would suffice.

This lecture is intended as the first of a series upon artistic anatomy. We will find our subject comprehensive enough not to admit of digression.

* Blanc, Grammar of Art—Translation by Kate N. Doggett.

† An excellent work for the artist to read on this subject is Von Bezold's Theory of Color.

Galen describes the human bones accurately enough, but it appears that very little was accomplished by the ancient Greeks in anatomical studies until the days of Erasistratus, who enjoyed the rare privilege of dissecting criminals alive. Flaxman,* whose lectures on sculpture I advise every artist to read, gives in detail the evolution of art anatomy so far as it is known. John Marshall† prefaces his bulky volume entitled *Anatomy for Artists*, with a very interesting history of this subject. The remainder of Marshall's work will answer very well for reference. Fau‡ affords us, in cheap, condensed form, some very beautifully executed illustrations of the human anatomy, but his text is worthless. Haydon,|| old as his work is, in a few pages of his second and third lectures, gives the most concise, and, to the artist, valuable description of the bones and muscles extant. Fau's plates, Haydon's lectures, with a skeleton and cadaver, will answer, though there are some essential things omitted by Haydon and matters introduced, which are unimportant. Hodges' little book § added, will leave nothing to be desired, unless the artist wish to excel in anatomy, in which case he can have recourse to the larger medical works.¶ But there is danger of Haydon's fate being encountered, in mistaking or substituting the means for the end. The painter or sculptor may cease to be an artist in too toilsome anatomical work.

In the many positions possible for the body to assume, there are exhibited certain surfaces, protuberances, ridges, depressions, prominences, curves, angles and lines produced by parts of bones, joints, muscles, tendons and veins, partially obscured by layers of fat, all beneath an investing sheet of cuticle. To be able to depict the outer form properly, the artist must know something of the underlying tissues, just as the sculptor seeks first the exact contour of body and limbs, before clothing them with clinging drapery.

* Flaxman, *Lectures on Sculpture*.

† John Marshall, *Anatomy for Artists*.

‡ J. Fau, *Elementary Artistic Anatomy*. Translated by Blake.

|| B. R. Haydon, *Lectures on Painting and Design*, Vol. I.

§ Hodge, *Practical Dissections*.

¶ Henle, Sharpey and Quain, Gray, Leidy, Holden, II. Allen, etc.

It is probable that the early Greek artists contented themselves with externals, to which fact many defects are attributable. According to Vitruvius, geometrical rules were applied by them, however, two of which we have in the human figure included in a circle and square, the fingers of the outstretched hands and arms touching the periphery.

The male body was also divided by the Greeks into eight heads. Fau modifies from Jean Cousin's* measurements as follows: Beginning at the summit of the head, and ending at the heel, the eight heads are included by lines drawn through the lower part of the chin, nipples, navel, pubis, middle of thigh, knee, below the calf. The head is divided into four noses, similarly, at hair line, origin of nose, upper lip, end of chin; a nose length lies between chin and supra-sternal fossa. The other proportions, as well as those mentioned, are best represented by diagrams at hand in the Academy. For details I refer you to Flaxman, Fau, and future lectures.

With anatomy as an indispensable groundwork, the artist soon finds himself erecting a superstructure of physiology, physiognomy, and thereupon analyses of beauty and the emotions.

The contraction of the muscles of the face in differing degrees and combinations, have come to be recognized as exhibiting certain inward conditions, called emotions, mainly those of pleasure or displeasure; a pleasing symmetry of form and benignity of expression is styled beauty; and from time out of mind, physiognomists have sought to read the secrets of others in the appearance of the face, and in the demeanor. The nervous action which results in expression; the contraction of muscles; the distension of the veins; all these, and more such which the artist must consider, are physiological processes.

Beauty of form is a strictly anatomical subject. To the thoughtless, it is an indefinable appearance which pleases; to the philosopher it is much more. Its appreciation is governed by the law of relativity, as is everything else in the universe; and every nation, nay, every individual, has its and his own standard. In portraying the queen of heaven, the Madonna was Italian, French,

* *L'art de dessigner de maistre Jean Cousin, Paris, 1680.*

English, Spanish, Flemish or Dutch, according to the nationality of the artist. The Hollander favored a rotundity of form which others would call fat and squab. The African, Asiatic, American and European types differ immensely, indeed, to a provincial extent, among themselves; so much so that beauty on one side of a river, mountain range or political boundary, would appear hideousness to the inhabitants of the other side. Symmetrical softness of outline, in conjunction with nicely blended colors, seems to be, *nearly*, the universal ideal of the graceful and beautiful. Hogarth * attempted the general application of his wave line, not only to beauty of animal form, but to architecture, landscape, etc. He carried his single principle too far, for Gothic architecture is attractive in its angularity, and a rugged landscape may be beautiful without the presence of a curve. In general terms, however, Hogarth was right. Edgar Poe's words here seem appropriate: † "The mathematicians afford us no more absolute demonstrations, than the sentiment of his art yields to the artist. He not only believes, but positively knows, that such and such apparently arbitrary arrangements of matter, or form, constitute, and alone constitute, the true beauty. Yet his reasons have not yet been matured into expression. It remains for a more profound analysis than the world has yet seen, fully to investigate and express them." Poe said aright, that it was not allotted to the artist to analyze his instincts and sentiments. In another connection we will see that the artist himself must needs be analyzed first, and it was not till Herbert Spencer's day that this was done. To the artist beauty is a sentimental consideration; to Spencer sentiment is a matter susceptible of explanation. Hence the Spencerian analysis of beauty should be sought for by the artist.

In his Nov. 10, 1759, letter to the *Idler*,‡ Sir Joshua reviews this matter fairly, for the time in which he lived. He alludes to habit or custom making, in a certain sense, white black, and black white. He supposes that "were an Ethiopian to paint the

* *The Analysis of Beauty*, written with a view of fixing the fluctuating ideas of taste. By William Hogarth. London, 1810.

† *The Landscape Gardener*. Edgar A. Poe.

‡ *Reynolds' Works*, Vol. II, p. 134.

Goddess of Beauty, he would represent her black, with thick lips, flat nose, and woolly hair. We, indeed, say that the form and color of the European is preferable to that of the Ethiopian; but know of no other reason we have for it but that we are more accustomed to it." * * * * "From what has been said, it may be inferred that the works of Nature, if we compare one species with another, are all equally beautiful, and that preference is given from custom, or some association of ideas, and in creatures of the same species, beauty is the medium or center of all its various forms." Aristotle writes:^{*} Every art, every method and every institution, every action and council, seems to seek some good; therefore, the ancients pronounced the beautiful to be the good." There was a time when it was flat heresy to dissent from Plato or Aristotle. We are to-day privileged in a measure to use our own brains, and may safely pronounce the assertion a sentimental one, which strikes the heart strings tunefully, but for all that, it is pure jingle, bad logic; conclusion absurd and *non sequitur*. Read Spencer's Data of Ethics,[†] if you wish to see the reasons for conceiving the beautiful and the good to be identical. In the shortest possible language, it is a praiseworthy delusion; it is because we want to do so, not because there is any inherent identity.

Alluding again to the fact that habit, custom or education governs our regard for beauty, Hogarth[‡] calls attention to the exquisite sinuosities of the human bones. Hogarth had familiarized himself with the skeleton in seeking his lines of beauty therein, and speaks of the "beautiful ossa innominata," while young lady pupils are very apt to shudder when first shown a skeleton, and pronounce it disgusting and horrible. It is a very common thing for anatomists to go into as many ecstacies over an exhibition of beautifully proportioned bowels in the dead body as a lady would over a duck of a bonnet, yet ladies may become naturalists and discuss with their intellectual peers the cunningness and loveliness of snails, spiders, ear wigs and angleworms. Similarly we all laugh at the fashions of dress of a few years back

* Aristotle, *Treatise on Morals*.

† Herbert Spencer's *Data of Ethics. Elements of Psychology*.

‡ *Analysis of Beauty*, p. 55.

just as we will wonder a few years hence how we could have been so absurd as to dress as we do to-day.

Aside from Hogarth's attempt to make too much of the curve idea, his Analysis is well worth reading. He has collected therein many useful hints not to be found in other authors; he notes for instance: "There is another very extraordinary circumstance which nature hath given us to distinguish one age from another by, which is, that though every feature grows larger and larger, until the whole person has done growing, the sight of the eye still keeps its original size; I mean the pupil with its iris or ring; for the diameter of this circle continues still the same, and so becomes a fixed measure by which we, as it were, insensibly compare the daily perceived growings of the other parts of the face and thereby determine a young person's age. You may sometimes find this part of the eye in a new-born infant fully as large as in a man of six feet, nay, sometimes larger. In infancy the faces of boys and girls have no visible difference, but as they grow up the features of the boy get the start and grow faster in proportion to the ring of the eye than those of the girl, which shows the distinction of the sex in the face. Boys who have larger features than ordinary in proportion to the rings of their eyes, are what we call manly featured children as those who have the contrary, look more childish and younger than they really are. It is this proportion of the features with the eyes that makes women when they are dressed in men's clothes look so young and boyish; but as nature doth not always stick close to these particulars, we may be mistaken both in sexes and ages." The facts to which Hogarth calls attention may be summed up to the effect that no matter what changes growth may cause in the relative sizes of faces, at all ages and in both sexes the absolute size of the pupil remains the same. There is a physical explanation in the retina of all alike requiring the same amount of light for visual impressions. The adult can see no better or more than the infant, and this is often true in more senses than one.

An important item concerning the eye seems to be ignored by most writers upon art. The cornea or glassy part of the eye is a small globe segment laid upon the sclerotic or white of the eye,

the eyeball having a larger radius than the cornea. This appears to have been known to many of the ancients though not faithfully reproduced in the casts taken from their statuary. Some sculptors even of acknowledged eminence have what appears to me to be the abominable trick of gouging a hole in the globe to give the effect of reflection. This might be justifiable in colossal figures but in fine statues it would be better art, certainly truer art, to carve the eye as it actually is, with its superimposed cornea.

You will encounter many pretentious works that profess to unravel the secrets of the human face. The versatile Rimmer * has contributed a ponderous set of drawings and "observations" to the physiognomical muddle. His analytical text and classifications are simply soul-harrowing in their artificiality. Sir Charles Bell † was the first to contribute to the subject scientifically, but the windy Zurich parson, Lavater,‡ is more widely known as a writer upon physiognomy because his vaporings suited the superficial readers who always outnumber the thinkers. Strip Lavater's books of their ejaculations, and they undergo great reduction in size. He seems to have been lost in rapturous admiration of his own conceits. He finally compresses his views into one hundred rules, which carefully read yield six per cent. of truth, twenty-four per cent. of downright malevolence, and seventy per cent. of nonsense. I am sure the ladies will not consider this attack a harsh one when they are told that Lavater's seventy-first rule begins: "Vanity or pride is the general character of all women."

The physiognomy of the past is the childish attempt to judge gentility by dress. A beautiful face is a good face: only the wicked dress shabbily, etc., although food for reflection was furnished by some facts like these: Socrates had a stupid, villainous looking head; Christ is recorded as possessing no comeliness, and St. Paul's appearance was insignificant. There is no denying the justness in many, possibly the majority of cases, of the childish estimate, which but slightly modified, is the same as our own off-hand determination of character by appearance, but if we ask

* Dr. William Bimmer, *Art Anatomy*, Boston, 1877.

† Sir Charles Bell, *Anatomy and Philosophy of Expression*, 1806.

‡ J. C. Lavater, *Essays on Physiognomy*.

ourselves *why* does such a face impress us as being a "good" one and another as being "bad," we must go deeper than the skin. Take the favorable instance of a really kind-hearted, upright person in fair circumstances and good health, with the purely accidental accompaniment of regular features and fine complexion. The goodness in him shows in his face, we say. Why? Because he is not distressing himself with unnecessary schemes and cares, and his consciousness of having harmed no one, nor wishing one harm, enables him to look you fairly in the eye, without the impudence of the domineering person, who can do the same only in a disagreeable way. Your good man is usually so self complacent and good humored that his eye twinkles and his face is wreathed in smiles, and that is about all there is in the so-called "good face." Cannot each one of us recall some such face with which we were prepossessed only to discover in time that we had been deceived in the possessor? To convince you how we often err in the opposite direction it is worth mentioning that defective eyes impart an appearance of character wholly undeserved by the individual estimated. Thus convergent strabismus and contracted pupils give sinister expressions to the face; divergent strabismus a foolish look; while dilated pupils or protuberant eyes express a surprise which the persons afflicted with them may be far from feeling. Lavater's method of discrimination was carried to an absurd degree by a wealthy St. Louis merchant during my boyhood. He declared that without exception, every one-eyed man was a scoundrel. Soon after making this brilliant remark he lost an eye himself, and to add to the whimsicality he happened to be a pretty bad fellow. The poetical justice of the accident impressed itself firmly on my mind.

Winckleman said that superstitious reverence for the works of their ancestors prevented improvement among the Egyptians. Apropos of this, with much less truth, Disraeli causes one of the characters in his last novel to remark, that there is nothing original about the Americans, their ideas, their institutions, their arts are all borrowed, even their language is imported. There is an undeniable toadyism among the snobs of America, but it may be truly said that we imported both toadyism and snobbery from our mother country. In the matter of art we affect a reverence

for the old masters with all the insincerity of our English ancestors. Listen to these words of the first president of the Royal Academy: "The keeper of the Vatican told me that it has frequently happened that many of those whom he had conducted through the apartments have asked for the works of Raphael, and would not believe that they had already seen them, so little impression had these performances made on them. One of the first painters of France once told me that this circumstance happened to himself, though he now looks on Raphael with that veneration which he deserves from all painters and lovers of art. I remember very well my own disappointment when I first visited the Vatican; but in confessing my feelings to a brother student of whose ingenuousness I had a high opinion, he acknowledged that the works of Raphael had the same effect on him, or rather that they did not produce the effect which he expected. This was a great relief to my mind, and on inquiring further of other students, I found that those persons only who from natural imbecility appeared to be incapable of relishing those divine performances, made pretensions to instantaneous raptures on first beholding them."

We thus have authoritative sanction for the belief that genuine admiration for the ancient in art, simply because it is ancient, can only come by cultivation, just as we learn to relish classical music or Limburger cheese. Please understand that I am far from disparaging old artistic productions. There have been undeniably very many grand statues and pictures worked out by gifted brains and hands in the early centuries, but, by all that is honest, do let us use our own eyes and determine for ourselves the merits of art work. Did it ever occur to you that "recognition" can be largely bought and that many sublime modern works are this day feeding rats and moths and that their authors are starving in attics because the accident of "recognition" has not happened to them? What up-hill work Reynolds and Benjamin West would have experienced had they not met with Royal favor. The want of it killed poor Haydon, and Elizabeth Thompson's fortune was made when Victoria purchased her "Roll-Call," after the artist had been repeatedly "skied" by the Academy. One of Raphael's pictures, his "Madonna dei Candelabri," has arrived in New York,

and all snobdom rushes to view and praise it. That same group of "spirituelle" heads and candles might have hung till doomsday in its present place without attracting more than casual notice, had its authorship been unannounced. It is my business as your scientific teacher to bid you open your eyes to the defects in your arts and artists. You can get all the sincere and insincere adulation you may desire for the objects of your reverence from many other sources. To quote from Sir Joshua again : "I consider you as arrived at that period when you have a right to think for yourselves and to presume that every man is fallible; to study the masters with a suspicion that great men are not always exempt from great faults; to criticise, compare and rank their work in your own estimation, as they approach to, or recede from, that standard of perfection which you have formed in your own minds, but which those masters themselves, it must be remembered, have taught you to make. It is their excellencies which have taught you their defects."

"Nor would we have it thought" says Hogarth, "that the ancients or moderns have yet come up to the utmost beauty of nature. Who but a bigot, even to the antiques, will say that he has not seen faces and necks, hands and arms in living women, that even the Grecian Venus doth but coarsely imitate?" It is said that Barnum had on exhibition the skull of Washington when he was a boy, but that is no worse than the anachronism of Rubens, who represented St. John the Baptist as an elderly man while Christ was a child, in the same picture. An altar-piece presumably of the Flemish school, depicts Abraham about to sacrifice Isaac with a blunderbuss. This seems absurd enough, but what must we think of deliberate anachronisms such as the Hyde Park Lord Wellington apeing Achilles, and the Greenough Washington as Jupiter Olympus with tunic and toga. There is one, among several, good features in this statue; it was too large to be placed in the rotunda so it now sits looking toward the senate wing of the Capitol, while the right hand points toward the old Capitol prison.

Samuel Kneeland* deprecates the indulgence by the artist in

* The Monstrous in Art, *Popular Science Monthly*, p. 731, vol. xiv.

worn out mythological conceptions. He dubs the centaurs and sundry other hexapod mammal impossibilities as monstrous, and concludes: "Fidelity to truth cannot injure anything but the false and the temporary. The essentially beautiful must be in nature; it cannot be beyond it, above it, nor below it; the merely ideal in form can have no real existence in the mind of man."

Falsification has had many powerful upholders. The first lecturer at the Royal Academy decried fidelity in historical pictures. Generals must not be represented one-armed, one-eyed, or otherwise maimed if they really were so; the likeness must be sacrificed to the conception of heroic form. He criticised Bernini's David as undignified because the figure bit the nether lip while using the sling—a most natural attitude. Our Phil. Sheridan would have been painted by this "nature mender" as a giant, and Abraham Lincoln as an Adonis. As an outcome of that sentiment we have De Soto just out of a bandbox on the banks of the Mississippi, and Washington about to make New Year's calls across the Delaware—judging from his apparel.

You will, during the remainder of your lives, meet with enough blind adoration of the old masters and their executions to enable you to stand a little fault-finding. It requires some time for an anatomist to recover from such a shock as this: There are groups of muscles on the forearm known as flexors, because they flex or bend the wrist toward the shoulder. It is a matter of very easy demonstration, that the group called flexor digitorum sublimis has its origin at the inner condyle of the humerus, the inner side of the coronoid process of the ulna and oblique line of the radius. It would be thus well thrown at its origin toward the ulnar or inner side of the arm. In Rembrandt's "Dissecting Room" or "Anatomy at the Hague," 1632, Prof. Nicholas Van Tulp appears to be demonstrating to the guild of Amsterdam surgeons, an anomaly not on record. As well as can be made out, the picture shows this muscle coming from the radial or outer side, the outer condyle of the humerus.

Reverting to the intentional false in art, and to the report that there is not a reliable Grecian likeness extant, Tuckerman *

* H. T. Tuckerman's Book of Artists, p. 605.

describes two busts of Daniel Webster, by Hiram Powers and another American sculptor. Powers idealized Webster's head into that of a demi-god. The other artist made a faithful likeness. In Tuckerman's words "mathematically correct in dimensions and feature, wholly unidealized, and therefore universally recognized and prized by personal acquaintances of the statesman; in the hotels he frequented, in the homes of his friends, and in public halls, this bust is constantly seen." The friends of Webster favored the accurate likeness, but as they passed away the fanciful bust of Powers contended for a share of popular favor. At last the succeeding generations came to know the truth and even official recognition (questionable but significant honor) was not awarded Power's *Jovian* Webster, but the fifteen cent postage stamps are adorned with an engraving from the bust of *Daniel Webster*.

If a likeness is not a likeness, should it usurp the place of one? A deserved fate awaits the falsification of the historian, the artist, and any one who hopes to have his works outlive him, and who tries to perpetuate a lie in ink, in colors or in stone. Imagine the archaeologist unearthing Greenough's Washington, or the Hyde Park Wellington. The attire of those figures would be to him an unwarrantable anachronism, not to be explained away. Admit Reynolds' historical falsehood into your pictures, and have future ages say of you, "Nothing reliable in their art; no dependence upon their figures as representations." Everybody modern is somebody else ancient.

Let us now look at a more pleasing and hopeful aspect of art, which walks hand in hand with science. As science ever instructs and assists art, so does art assist, elevate and perpetuate science. They are inseparable companions, coming to each other's rescue, when, as they journey, one or the other lags by the way. Up to the beginning of this century, the arts developed much more rapidly than the sciences, with the exception of the mathematical. There is a reason for it in the evolution of society. The ornamental precedes the useful, among all races; similarly, the emotional and sentimental is developed before the reasoning faculties, and furthermore, the emotions have suppressed, and always will,

to a greater or less degree, trample upon and hinder the progress of the intellectual.

I appeal to the history of the world for verification. The beginning of history shows man to have been a true savage everywhere, with the emotionalism and want of reflection of a child. As he passed into barbarism, he merely refined his savage desire for display. He was but little less bloodthirsty; he grew more artistic in his decorative ability, but cared little for science, except as it aided his brawls and crusades. The barbarian merges by slow degrees into civilized man, and we behold sculpture, painting, and decorative arts greatly developed, while John Calvin burns the anatomist Servetus alive, while Giordano Bruno is destroyed at the stake, Galileo is imprisoned, Copernicus anathematized, Roger Bacon's chemical revelations rewarded by the monks' dungeon. But, we say, a better time has come, in which the scientist may speak and write as he wishes. True, we no longer burn and hang for opinions' sake; we have so refined our cruelty that we do even worse, we ostracize, ignore and sneer at living truths, and the men whose shoes we are not worthy to blacken, conscientious men, who have devoted their lives and rare intellects to the elucidation of problems of the utmost importance to their fellow-men. Science has taken a stride in the last twenty years, through the exertions of two men in England, the importance of which art is slow to comprehend. There has been recently laid at rest in Westminster Abbey, by the side of Sir Isaac Newton's remains, the body of Charles Darwin, who during his lifetime was made the butt of the brainless mob. It is only within a few years that the sapient editorial and ecclesiastical mind has gained a modicum of appreciation of the genuineness of his labor, and it is as amusing as it is disgusting to know that one of our city pulpit orators, the celebrated "assimilator," who had for years been damning Darwin and his works, amazed at the unimpeachable testimony brought forward to show the purity and sincerity of the philosopher's life, alluded to him, when dead, as the *saintly* Darwin.

Charles Darwin's "Expression of the Emotions in Man and Animals;" is a book every artist should own and study. It sets

forth, in the most convincing manner, the reasons for every contortion of face and body which the artist can depict. I will attempt to pass rapidly in review a few of the deductions, referring you to the book for the methods by which these were attained. Three main principles underly expression :

I. The principle of serviceable associated habit.

II. The principle of antithesis.

III. The principle of action due to the constitution of the nervous system, independently from the first of the will, and independently, to a certain extent, of habit.

Each principle could afford us subject-matter for a series of lectures, so we must be content with a few illustrations. A person threatened with some imminent danger, as a blow, or something falling upon him, involuntarily jumps away, closes his eyes, and stretches out his hands to ward off the injury. Now, this is a serviceable action, evidently, but the same person may perform the same maneuvers upon hearing some startling, unpleasant intelligence, without immediate danger, or any at all, to the listener; for instance, the announcement of the death of a friend.

" Many carnivorous animals, as they crawl toward their prey, and prepare to rush or spring on it, lower their heads and crouch, partly, as it would appear, to hide themselves, and partly to get ready for their rush; and this habit, in an exaggerated form, has become hereditary in our pointers and setters. Now I have noticed, scores of times, that when two strange dogs meet on an open road the one which first sees the other, though at the distance of one or two hundred yards, after the first glance always lowers its head, generally crouches a little, or even lies down; that is, he takes the proper attitude for making a rush or spring, although the road is quite open and the distance great. Again, dogs of all kinds, when intently watching and slowly approaching their prey, frequently keep one of their fore-legs doubled up for a long time, ready for the next cautious step, and this is eminently characteristic of the pointer. But from habit they behave in the same manner whenever their attention is aroused. I have seen a dog at the foot of a high wall, listening attentively to a sound on the opposite side, with

one leg doubled up; and in this case there could have been no intention of making a cautious approach." This sufficiently illustrates the first principle, though it embraces an immense range of expression.

Next, "When a dog approaches a strange dog or man in a savage or hostile frame of mind, he walks upright and very stiffly, head raised, tail erect and rigid, hairs bristling, pricked ears directed forward, eyes staring fixedly. These actions follow from the dog's intention to attack his enemy. As he prepares to spring with a savage growl on his enemy, the canine teeth are uncovered, and the ears pressed close backward on the head. Let us now suppose that the dog suddenly discovers that the man whom he is approaching is not a stranger, but his master; and let us observe how completely and instantaneously his whole bearing is reversed. Instead of walking upright, the body sinks downward, or even crouches, and is thrown into flexuous movements; his tail is lowered and wagged from side to side; his hair becomes smooth, ears depressed and drawn backward, but not closely to the head, and his lips hang loosely; the eyes no longer appear round and staring. These motions are explicable solely from being in complete opposition or antithesis to the attitude and movements, which, from intelligible causes, are assumed when a dog intends to fight, and which, consequently, are expressive of anger."

The cringing stoop of human humility is antithetical to the attitude of pride or defiance.

Trembling of the muscles is accounted for by the third principle—it is due to the escape of nerve force. Similarly laughter may, when not sufficing to relieve the emotion of merriment, be supplemented by a burst of tears, by way of escape for overplus nerve energy. In a future lecture I shall go into this matter in detail, showing you how each muscle of the face, by contracting, produces expressions. A formula in terms of muscular contraction may be easily constructed for hope, fear, rage, hatred, love, joy, etc. Dissimulation does not succeed in masking these expressions always, but it must also be considered. If you care to go deeper into the evolutionary study, it will reveal to you why the sexes appear alike until certain juvenile ages. It will show

you that all vertebrate animals are built upon one general plan, and deviate from each other in all particulars by easy gradations. It will not only show you that the "human face divine" is possessed by every mammal at intra-uterine periods, but that man's features are really retrograde affairs.* Man himself has not as good eyes as the falcon, nor has he the swiftness of the deer or olfaction of the hound, though he demonstrably descended from progenitors who were his superiors in these respects.

Darwinism will, it is true, shatter many a false conception upon which the artist doted, but it is merely a substitution of truth for falsehood, fact for glamour. It is not necessary for the artist, to-day, to believe in mythology to enable him to carve Aphrodite or Zeus. Emotion can be as well put upon the canvas—yes, better expressed for being understood, for the painter having recognized the evolved expression through the researches of Gratiolet, Spencer, Huxley, Haeckel and Darwin. The true artistic mind will not shrink from even so repulsive a subject as physiognomy among the insane. Bucknill and Tuke, on Psychological Medicine, afford you a treatise on that head. Instantaneous photography has recently revealed how little our poor eyesight is to be relied upon in determining the true position of animals in motion. Recent periodicals† can be consulted upon this subject, but the artist would blunder sadly if he were to paint animals in motion as the camera sees them, instead of trying to fasten in his picture the impression to which the defective human eye is accustomed. Both Haydon and Flaxman laud the Elgin marbles for their fidelity. There is in them a distinct departure from the legendary methods of chiseling with eyes shut and a master's words ringing in the ears. Better, indeed, to copy nature mechanically, and afterward thoughtfully add "*Il poco piu*" of the finishing hand. "Art is a language. Followed to its legitimate significance, this definition affords at once a test and a suggestion of its character and possibilities; for language is but the medium of ideas, the expression of sentiment—it may be purely imitative or pregnant with individual

* Minot, *American Naturalist*, 1882.

† *Century Magazine*, July, 1882. *Popular Science Monthly*, 1882.

meaning—it may breathe confusion or clearness, emotion or formality, the commonplace or the poetic. The first requisite for its use is to have something to say, and the next to say it well." Durand* asks: "Why should not the American painter in accordance with the principles of self government, boldly originate a high and independent style, based on his own resources?" As to the method thereof, he remarks: "Go first to nature, to learn to paint, and when you have learned to imitate her, you may study the pictures of great artists with benefit. If you ask me to define conventionalism, it is the substitution of an easily expressed falsehood for a difficult truth." Cole wrote on the cover of a sketch-book, soon after his first visit to Europe in 1829:

"Let not the ostentatious gaud of art,
That tempts the eye, but touches not the heart,
Lure me from nature's purer love divine;
But, like a pilgrim at some holy shrine,
Bow down to her devotedly, and learn
In her most sacred features, to discern
That truth is beauty."

"Who shall presume to imitate the colors of the tulip, or to improve the proportions of the lily of the valley? The criticism which says of sculpture or portraiture that 'Nature is to be exalted, rather than imitated,' is in error. No pictorial or sculptural combination of points of human loveliness do more than approach the living and breathing human beauty as it gladdens our daily path."‡

Byron, who often erred, erred not in saying:

"I've seen more living beauty, ripe and real,
Than all the nonsense of their stone ideal."

* Tuckerman, *Book of Artists*, p. 27.

† Op. cit., p. 196.

‡ Edgar Poe, *Landscape Gardener*.

ARTICLE II.

A CONTRIBUTION TO THE HEREDITARY AND PATHOLOGICAL ASPECT OF VICE. By G. FRANK LYDSTON, M.D., Late Resident Surgeon of the Charity and State Emigration Hospitals, New York. Lecturer on Genito-Urinary and Venereal Diseases at the College of Physicians and Surgeons, Chicago. (Read before the Chicago Pathological Society, December 11, 1882.)

The hereditary and pathological aspect of vice in its protean forms, is a subject which has, of late years, attracted considerable attention at the hands of a few enthusiastic observers, and has been pretty thoroughly and exhaustively analyzed, but it has not, however, received sufficient attention from either medical or civil investigators to render superfluous further discussion of the subject by those who enjoy the relatively rare opportunity of practical observation of our criminal classes. I have, therefore, taken the liberty of presenting the conclusions drawn from somewhat extensive personal observations, although mainly corroborative of statements made by higher authorities upon the same subject.

There seems to be but little doubt that morbid physical conditions are often responsible, indirectly, for many of the phases of conduct that we term criminal. An individual who is suffering from severe pain is not in a condition of stable mental equilibrium, as many persons may be able to verify by introspection under such circumstances, and it is still more evident that one who is subject to profound nervous disorder is likely to suffer from impairment of the higher mental faculties, as evidenced by enfeebled will, and illogical reasoning, associated with a perverted moral sense. And not only the nervous system, *per se*, but through it, indirectly, disturbed functions of the structures of organic life may also be responsible for disturbed mentality. In this connection I will venture to quote a passage from a recent address by Dr. George Perkins, at the opening exercises of the University of Vermont:

"A man whose digestive system is a continual scourge, whose nervous system is feeble or irritable, whose brain receives a supply of impure blood, cannot be the same man morally that he would be were he in the full vigor of health. Well men are not always virtuous. Ill health is not always the sole cause of crime, nor can criminals be treated as invalids; yet crime is often both the parent and offspring of disease. Since we may not know the exact relation of pathological conditions to crime, we must punish crime as such, but because of our ignorance as to its cause, we may be liberal with our charity and lenient in our judgment, whenever, and to such extent, as they may not interfere with the welfare of society as a whole."

The doctor evidently appreciates the fact that more law than justice is dispensed to criminals sometimes, but in the light of our present knowledge, it is difficult to see a solution of the problem which will serve to remedy the evil, or prove satisfactory to society at large.

The leniency and sympathy of the few are not likely to prove of great practical value to the criminal. I do not think that the influence of disturbed organic functions upon the mind is at all over-rated. The association of melancholia with a disordered liver, or of gout and a bad temper, may serve as striking examples of this fact, and hardly any one would claim that cheerfulness and a bad digestion are not incompatible. To determine an anatomical or pathological basis for crime is by no means an easy problem, but it has recently received considerable study from industrious scientists, although their results have been by no means conclusive. The studies of Benedikt and Osler, in this direction, have been especially interesting. Benedikt claims that in criminals the brain is atypical, and different from the average human brain in the cultured races. The variations consist chiefly in the atypical conformation of certain gyri and fissures, there being a confluence of many primary fissures, and there being found four horizontal convolutions. The experiments of Osler are, to a certain degree, confirmatory of Benedikt's, although not quite so definite. He claims, however, that the confluent fissure type is not so prominent as stated by Benedikt. A certain amount of disparity in the results of the two observers

may be ascribed to the probable fact that the American criminal type is not so strongly marked as the European. The chief sources of fallacy are, that this atypical arrangement of the fissures and gyri may co-exist with a superior general development of the convolutions, and that it has not yet been proven that the same arrangement does not exist in other classes of individuals. Further experiment and observation will be necessary to determine the co-relation between certain mental attributes and the confluent fissures and increased number of frontal gyri. The experiments of these observers have been solely with reference to the criminal cerebral type, but observations upon the condition of other organs in habitual criminals have been made by others. The results of the observations of Bruce Thompson, in the general prison of Scotland, are striking. To use his own words: "In all my experience, I have never seen such an accumulation of morbid appearances as I witness in the post-mortem examinations of the prisoners who die here. Scarcely one of them can be said to die of one disease, for almost every organ of the body is more or less diseased." These results do not differ much from those seen post-mortem in almost any large public hospital in which a large number of cases from the lower classes are treated, so that they can hardly be adduced as evidence of the pathological nature of crime. Most of the morbid changes which are responsible for many criminal actions are not physically demonstrable, but are too occult to be detected by any means of investigation which are, or perhaps ever will be, at our command. These changes are mainly in the nervous system, and oftentimes give manifest morbid results, even when the exact condition is not discernible. Another point to which I would call attention is the statement of Thomson, to the effect that physical defects and deformities were remarkably frequent among the convicts under his charge. My own observations do not confirm this, inasmuch as the physique of the men whom I observed was fair, on the average, and the proportion of physical deformities no greater than might be expected in any community of a similar size, although those that did exist were frequently very marked.

My own experience with the American criminal as represented by those confined in the Blackwell's Island Penitentiary, and which may be taken as a type, differs from that of Thomson in some respects. I found that the men were of fairly robust physique, on the average, and that the proportion of men who were really ill, aside from venereal and alcoholic affections, was comparatively small for such a large community, living under circumstances so favorable for the development of disease.

Malingeringers were, of course, numerous, and their pertinacity, and morbid appetite for specially prepared mixtures of green soap and assafoetida was certainly surprising; but the percentage of genuine invalids was quite small. Those cases of sickness which did occur, however, were often due to profound visceral lesions, but could generally be traced to the patient's habits of life, intemperance and exposure, with, in some cases an organization hereditarily defective. The reason for this difference in the results obtained by myself and those claimed by Thomson, is partially explicable from several considerations. The most important of these is the fact that the majority of metropolitan criminals, when so affected by disease that they can no longer carry on their avocation, which requires a considerable amount of physical vigor in its pursuit, enter the various charitable institutions and there terminate a miserable existence.

I found, therefore, in the Charity Hospital, the patients of which were recruited to a large extent from the very slums of the city, almost as great a variety and extent of pathological changes as those described by Thomson. A certain proportion of these patients must necessarily be excluded from the criminal type proper, thus diminishing the relative proportion of pathological changes found in the latter. There is no question in my own mind, but that the average results obtained by observations upon European and American criminals differ considerably, for another quite important reason besides that just given, and to which I will hereafter call attention.

The preponderance of the neuroses among the affections to which the criminal classes are subject, is strongly insisted upon by Maudsley, and in my own experience, this has been fully corroborated, for although, as I have before stated, the majority

of the convicts were healthy and comparatively robust, there was a strongly marked neurotic element in a large proportion of the cases of sickness requiring medical attention; epilepsy and neuralgias, and among the women cases of hysteria, being especially frequent. Cases of true insanity, however, were relatively infrequent, and I doubt whether many communities of a corresponding size, could show as few of the mentally disordered, as could that body of convicts.

Much has been said of the mental inferiority of the average criminal, and I have myself found that, as a class, they are mentally defective, often to the extent of imbecility, although often possessed of an extraordinary amount of brutish cunning. Occasionally, however, I have seen a really bright intellect among them, but generally in sporadic instances of criminality from the better class of the community, in whom necessity or acquired propensities were to a great degree responsible for their actions. The ordinary criminals appear to form one great genus.

Thomson states that he has never seen any manifestations of genius or artistic taste among criminals. On the contrary, there was seldom any difficulty in finding men of decided talent in the hospital under my charge. Exceptionally clever workmen in wood, such as expert cabinet-makers, experts in the manufacture of fancy articles and in carving, and skillful penmen, were nearly always at hand, even in cases in which the moral sense was extremely low. Probably the most important question relative to criminals is that of their moral status.

The assertion is often made that a certain class of our criminals are morally insane, and I think there is hardly a question of its truth. In nearly every instance of crime among habitual criminals, the question of the morality of the action is never considered, and indeed, there seems to be an entire incapacity for its appreciation. With these beings, crime is regarded as a business, subject to certain disadvantages, but having somewhat of the fascination of a game of chance. Their ideas of right and wrong seem to be based solely upon the extent to which their personal interests are involved, and the amount of risk of punishment incurred in the performance of a criminal action to attain certain ends. Their ideas of morality are not those engendered by an

instinctive sense of right and wrong, but to them it is something arbitrarily fixed by social custom for the protection of society, their natural enemy, a conformity to which is enforced by law, and a violation of which renders them liable to punishment. This absence of the moral sense is not confined to those criminals whose mental powers are of a low, or almost imbecile type, but it is also to be found among the more intelligent of them. When we consider this moral defect in the mental status of the more intellectual type of criminals, we can much more readily explain the failure of all moral persuasion in the case of the lower orders, in whom the mental state borders closely upon imbecility. To quote Maudsley, "Impulses to theft, incendiarism and violence are quite frequent in cases of imbecility, in which the passions are strong, and the intelligence feeble." We may readily appreciate a condition of moral imbecility, if we are at all observant of the creatures who fill our police courts and jails.

There is one peculiar fact which I have often noticed with reference to the moral sensibility of criminals. A criminal may be utterly oblivious to all moral considerations in many directions, and yet have a species of contempt, or even abhorrence, for certain phases of vice. Strange as it may seem, there is a certain degree of caste even in a prison, and the supreme contempt evinced by some of the assault and battery men for their brethren of the larceny list, among the criminals under my charge, was amusing in the extreme. In this connection, I will cite the case of the Rev. Brother Cowley, who, it will be remembered, served a time in the New York penitentiary, for his maltreatment of young children who had been consigned to his care in the so-called "Shepherd's Fold." I have seldom seen a person held in such aversion and contempt as was this man by the rank and file of the prison. The appellations bestowed upon him were more expressive than elegant, and I remember numerous arguments between the other convicts and himself, in which he endeavored to try the effect of moral persuasion upon them, and in which the reverend rascal got decidedly worsted. These men, ordinarily so completely lost to all moral impressions, and who deemed highway robbery and murder incidental to their lives, and the most natural thing in the world, although subject to the risk of detection and punish-

ment, had sufficient manhood to loathe such inhumanity as had been practiced by this educated fiend.

Analogous instances are numerous but I will cite but one other example. In the female department of the penitentiary hospital were criminals of all grades, from the accomplished female confidence operator, down to the petty larceny and shop-lifting class, and there was ample opportunity to observe the peculiarities of female criminals. There was as great a degree of caste among them as could be well imagined, and among the better class, the lower orders of viciousness and wrong-doing were held in great aversion. Perhaps the most striking instance was that of Madaine Berger, the notorious abortionist, who was under a five years sentence for causing the death of a well-known young woman of Brooklyn, a case that created considerable excitement at the time. This woman was held in about the same loathing, even among some of the lowest of these female dregs of society, as was Brother Cowley among the men. She was avoided and shunned by nearly all of them.

I have spoken of the neuroses as affections which have been strongly insisted on as a basis for crime, and have also stated that the neurotic type, in my experience, prevails among the disorders to which criminals are subject, and in reference to this point the question may be asked, whether the sequence of cause and effect is at all definite? and whether the same tendency to crime would not exist if these affections or neuroses were not present?

It must be confessed that the problem is by no means clearly solved, and we must acknowledge the fact that crime is frequent in cases in which there appears to be no neurosis or other predisposing cause. I think, however, that crime would not be by any means so frequent, were these causal elements eliminated. They undoubtedly lessen the power of volition and self-control, in the same manner, if not in the same degree, that they do in the higher walks of life, in which criminal tendencies are relatively infrequent, but in which the predisposition probably exists in many instances, and crime would actually occur, were the circumstances and necessities of the individual such as to act as existing causes. It may be argued, that there being a defective nervous organization among the lower types of humanity, as

represented by the criminal classes, we might conclude, *a priori*, that actual structural disease, or even functional disorder, would in them act as a more powerful causal element of crime than in persons in the upper strata of society, in whom the nervous organization is more perfect, and the mental discipline better. This argument is a valid one, but is, I think, counterbalanced by the disadvantages accruing from that same greater perfection of organization, which is readily appreciated, when we consider its greater sensibility and more powerful tendencies to emotional and erratic impulses, which are such prominent factors in the neuroses among our better classes.

In the lower ranks of humanity, a defective cerebral development is the rule, and it is from this lower class that the criminal element of society is chiefly derived. Now, it would be difficult to determine precisely how great an influence the causal elements of necessity and privation exert in such people, but it is obvious that there is something more than these factors required to explain the prevalence of crime among them; and what could be a more logical explanation than the fact of the existence of a defective cerebral development, with a consequent inferiority of the higher faculties of the brain, and a predominance of animality, which is so evident in the majority of criminals? A certain proportion of these persons might be saved from criminal impulses by proper training and discipline, and removal from the baneful influences by which they are ordinarily surrounded, but by far the larger number of them are afflicted with a nervous organization primarily so defective, that no amount of pains would serve to prevent the development of criminal tendencies on the occurrence of the slightest exciting cause. In this connection, however, we are compelled to acknowledge the well-known fact that the difference in the relative frequency of crime in the two extremes of society is, to a great extent, due to the more powerful influence of temptation and necessity in the one than in the other. This does not at all refute our argument as to the existence of defective mentality as a cause for crime in the lower walks of life, for, as we have seen, a certain proportion of the lower class of criminals might be saved by proper training and influence, while a certain proportion of individuals of the higher classes are possessed of

an inherent predisposition to vice, which is liable to develop into actual crime upon the occurrence of any exciting cause.

Acquired tendencies probably have much to do with the causation of crime in many cases, and this statement holds good especially in the case of the American criminal class, in whom the local effects of the co-operative influences of time, heredity and natural selection, in each community of low-bred criminals and wrong-doers, are not so manifest as in Europe. The same explanation would suffice for the disparity of results obtained by Benedikt and Osler, and for the statements of Thomson as to the frequency and multiformity of pathological changes, and the low brutishness noted in the criminals found in the Scottish prisons. In summing up the evidence in favor of a physical basis for vice, I think that a defective or imperfect general cerebral development, with its attendant predominance of the animal type, or superior development of the lower brain centers, must be conceded to be a powerful cause, and although the co-relation of actual pathological changes and crime is not at present demonstrable, or at all definite, the powerful influence of bodily ailments upon the higher functions of the brain must be allowed by every one. The old adage of "*mens sana in corpore sano,*" is perhaps nowhere more *apropos* than in the consideration of the causes of many instances of criminality.

I have spoken of the influence of heredity, which is so strongly set forth as a cause of crime, but only with reference to the hereditary transmission of physical defects and pathological conditions which react upon the mental and moral status of the individual. In addition to this influence of heredity, there is a special influence that is more important, and which is by no means a new consideration, having been recognized by most of the authorities who have given their attention to this subject. I refer to the hereditary transmission of intellectual and moral peculiarities, which as truly follows a definite law as does that of physiological and pathological conditions. An hereditary tendency to vice undoubtedly exists, and must be recognized in certain instances, as fully as are hereditary tendencies to disease of special types. The imprint of heredity upon mentality may be quite as strongly marked as it is upon the animal organization itself, and

the exercise of the mental powers in any vicious direction is as surely transmitted to future generations, in many instances, as a predisposition to vice, as is a taste for art, or scientific pursuits, in beings of superior intellect. To quote the words of Maudsley, "Just as a man may inherit the stamp of the bodily features and characters of his parents, so he may also inherit the impress of their evil passions and propensities. Of the true thief, as of the true poet, it may be said, that he is born, not made." Although this position is, in many instances, supported by fact, yet there are many cases in which it would be difficult to exclude the influence of circumstances and acquired tendencies. Ribot, in his excellent work upon heredity, touches upon the hereditary nature of vice. He makes the statement that such evil propensities as avariciousness, drunkenness, dishonesty, thieving, and a passion for gaming, are very often hereditary, and as an illustration of the well-known influence of heredity in the production of thieving propensities, he cites instances where whole families were addicted to stealing and like offenses. He also cites the case of a lady, who was afflicted with an inveterate passion for gambling, and whose son became a most reckless profligate and gambler, his evil tendencies developing when he was not at all subjected to the baneful influence of his mother's example. Whether this instance resulted as a consequence of the mother gambling during the period of her pregnancy, is not stated, but some might take that view of its causation.

It is a demonstrable fact that children of illegitimate parentage are peculiarly liable to become addicted to vice and crime, as a result of an hereditarily deficient moral sense, although it cannot be denied that such children are not usually favored with the tender care and judicious training bestowed upon children born under more favorable auspices, and that this has much to do with the development of immorality. Even when they are placed under the most favorable circumstances, however, their hereditarily vicious propensities are liable to exhibit themselves from the action of exciting causes which are many times remarkably slight. Consanguinity in the parents has doubtless as powerful an effect upon the moral and intellectual status of their offspring, as it often has upon the physical, which is so well recognized, and

moral imbecility, or, at least, a perversion of the moral sense, in the children, is not unlikely to result from such unions. Its effect in producing ordinary mental inferiority, or even insanity, is fully recognized. Parents possessing an unstable nervous organization, and who are perhaps afflicted with neuralgias of various kinds, epilepsy, chorea, hysteria, or allied affections, are also usually of inferior will power, and are not logical thinkers. They are quite likely to be erratic and notional, or a "little odd," as it is often termed. These defects are frequently transmitted to their offspring, and perhaps are intensified in them, and but too often associated with defective mentality, and a certain degree of moral anaesthesia.

We have, then, a strong predisposition, if not an inherent tendency to crime, and it is obvious that when it occurs, there are several factors in its production which should be recognized. These are, first, a nervous organization primarily defective, and either in a condition of actual disease, or strongly predisposed thereto. Second, a defective moral sense, or, so to speak, a moral anaesthesia. Third, a faulty and illogical reasoning power, which is liable to subvert the interests of the public to the seeming welfare or pleasure of self. Fourth, a vacillating and feeble volitional power. Sometimes, too, we have superadded to these causal elements, that of actual organic disease, with its attendant exaggerations of the moral perversion already existing. Against these powerful influences, especially when, as is often the case, they are associated with improper training or example, and the forces of necessity and temptation, many of the poor creatures so afflicted are unable to contend. The same argument is applicable to those unstable nervous organizations which so often become the victims of dipsomania. It is a well established and almost indisputable fact, that there are few more powerful factors in the production of drunkenness than heredity. It is not my purpose to enter upon the various causal elements of ineptitude, but merely to mention this single predisposing cause, which is perhaps one of the most important to be considered. Here, again, we have a faulty nervous structure, the equilibrium of which is easily overthrown, in addition to a will power hereditarily weak. It is also true that traits of character, and nervous

and mental defects which are acquired in one generation, may be transmitted to the next by the inexorable power of heredity, and so on for successive generations, retrogression being enhanced by acquired proclivities and moral conditions in each, until finally the race or family becomes extinct, nature thus relieving society of these moral pests.

There is something to be said with reference to the influence of uncontrollable impulses in the production of crime, and it must be conceded that deeds of violence such as murder or assault, often result from what must be termed "an uncontrollable impulse." But impulses to do violence under certain provocation, perhaps, arise in the best of us at times, and why is it that one should have the faculty of self-control rather than another? There may be no deficiency of the moral sense, *per se*, in an individual, and yet under proper stimulus he may commit murder. Have we not here, also, in many cases, the imprint of heredity in the form of defective mentality, with a consequent deficiency of volitional self-control as a predisposing cause to the act of violence? Very few murderers entertain the slightest idea of the moral relations of the act at the time of its commission, or reflect upon its consequences, but as the result of some great excitement from real or fancied wrongs, or the effect of alcohol in a subject in whom the power of self-control is hereditarily deficient, the small amount of that faculty he possesses is lost for the time, thus giving his evil animal passions full sway, and leading to a deed of violence, which, aside from the dread of consequent punishment, he may forever afterward regret. Many times, however, a murderer may regard his deed of violence as an eminently proper thing to be done, and as the only measure which will, in the least, satisfy his thirst for revenge or reparation, and indeed there are some injuries that cannot be repaired in any way, nor can anything but the life of the offender even approximately atone for the wrong inflicted. The self-consciousness of having violently deprived the offender of life, is a measure of satisfaction to such homicides. The man who kills the destroyer of his domestic happiness, or the betrayer of his sister, may be momentarily insane at the time of the discovery of his wrongs, and may kill the offender while such insanity exists, but

he may, on the other hand, be mentally and morally sound, and regard the case, not from its legal aspect, but from the standpoint of justice. Could any moral persuasion, however strong, convince such a man of the immorality of the act which he meditates? Not but that in after years he may regret the deed, however justly done, for I doubt much if there are many men, not morally defective, who can slay another, even in self-defense, without having an impress made upon their lives and characters which will tinge them ever after. I make this statement as a matter of personal observation. The fear of punishment often restrains a man from homicidal impulses, even when he is convinced of the justice of his cause, and would follow the old Mosaic law to the letter, if allowed to follow his own judgment and inclinations. Cases of this kind must often be excluded from our list of criminals who are predisposed to acts of violence by a defective mental and moral tone, but they may, on the other hand, be just such cases as we have considered, in which the injury suffered constitutes a more than sufficient exciting cause for the complete overthrow of all moral reasoning, and a thorough subjugation of the higher faculties of the mind to the merely animal impulses.

A very important phase of vice, and one which merits attention with reference to the influence which heredity exerts in its production, is prostitution. This is a subject which has received pretty thorough ventilation at the hands of enthusiastic moralists who have been earnestly seeking for a means of correcting or regulating the social evil, but with little success.

These people, it seems to me, take a very one-sided view of the matter, and make very little allowance for certain elements in the production of this vice, which I believe are so important. Some ascribe their want of success in controlling the evil to the fact that "the supply is regulated by the demand," and arguments of that nature. Now there is doubtless much truth in this assertion, but would it not be well for them to investigate the matter a little more thoroughly, and in a more liberal manner, with a view to the discovery of more logical and powerful causes? The same hereditary influences are brought to bear in the production of prostitution that we have found to exist in the

causation of the various forms of vice, and immorality in general. We have the same congenitally defective nervous organization, and the same moral insensibility that we have seen in connection with other vicious tendencies, or we have a similar transmission of mental and moral peculiarities; and it is my opinion that a large proportion of the women who are leading lives of shame are indebted therefor to an innate tendency to immorality, due to a deficient appreciation of the moral law, which, under favorable auspices, becomes a permanent factor of the daily life of the individual. This inherent immoral proclivity may not be hereditary in all instances, but may be peculiar to the individual, there being an immediate family line noted for virtue and uprightness, as is frequently the case, and it matters not whether it consists in a predominance of the animal passions alone, the reason and moral sense being unimpaired, but temporarily overpowered, or in a diminished appreciation of the moral law, associated with a feeble volitional power, the innate predisposition remains the same, and in either case may be hereditary. The predisposition existing, the exciting cause is of merely secondary importance, and such influences as the love of admiration and dress will be found to be the causes of fully as many instances of falls from grace, or at least of the adoption of a life of shame, as are the temptations and deceptions spread for the unwary by unprincipled persons.

Slight causes, indeed, are a fondness for admiration and dress, when contrasted with the moral law and other influences which are brought to bear upon a woman, with a view to keeping her in the right path, and only a recognition of the existence of a deficient appreciation of that moral law, will render such cases explicable. An admirable instance of the effect of such influences as I have given is cited by Sanger, in his history of prostitution: A family of seven sisters were induced to leave a moderately comfortable home, in a New England town, and enter a life of shame in the metropolis, one after the other, the sole inducement being the life of luxury and ease which such a course was supposed to bring. They happened to establish themselves in the same locality, occupying a number of buildings upon a prominent street, which has since borne the appellation of "The

Sister's Row." This is by no means an isolated instance, for it is a notorious fact that the proprietors of houses of ill-repute in New York City make, at more or less regular intervals, visits to the smaller New England towns and villages, for the purpose of recruiting their supply of boarders, and it is also true that there is usually a more or less definite understanding as to the life which they are expected to lead, although painted in glowing colors as to its luxuriousness. Surely, there must be a defective moral sense in such cases, for no matter how pleasant the prospective life, as depicted by the wily procuress, the fact that it is a life of sin could not be otherwise overlooked, or, at least, ignored.

Necessity, it is true, is at the bottom of many cases, but even this is many times more apparent than real, for how very many of these people entertain the most extravagant notions as to their necessities, and would not be satisfied with a life devoid of luxuries. Then, too, the predisposition existing, an excuse so valid as that of necessity, is very acceptable to one whose moral sensibility is already of a low grade, and I think that this moral anaesthesia is really the primal source of many of the departures from virtue and adoption of a life of vice. With reference to those who are really unfortunate, of whom there are but too many, I think that they comparatively rarely enter a life of shame, but seek to conceal their misfortune, and are but too anxious to redeem themselves should the opportunity offer. In spite of the views of many one-sided moralists upon this matter, I think that it will be found that in nine cases out of ten of the upper classes of the demi-monde, the life of the woman is one of choice rather than compulsion, and that the majority of them would not alter their mode of life if they could, and I have seen the experiment of redemption tried too often to believe otherwise. Exceptionally, through religious enthusiasm, a reformation may occur, but many of such converts are very prone to backslide. Those of the women of ill-repute who signify their willingness to adopt an honest life, are usually those whose lives have become squalid and miserable, and who are, perhaps, afflicted with disease. These poor creatures are, of course, but too willing to leave a life which no longer has charms for them,

and which holds out no other prospect than that of necessity, and a miserable death. While their attractiveness yet exists, and they are in demand, they can command a life of luxury and ease, and moral persuasion has but little effect upon them. Many cases of prostitution arise among the typical lower criminal classes, the same influences being brought to bear as affect the production of other vicious tendencies among such people. These cases are usually those in which there exists a sufficient amount of personal attractiveness to render a life of shame more profitable than one of petty thieving. Such women eventually drop back into the lower strata of criminal life when the period of their usefulness in their more gilded existence has departed. In such cases the innate tendency of their organizations inevitably causes them to gravitate lower and lower in the scale until they reach the very depths of degradation. Anyone who has observed at all closely the class of beings found in our houses of correction or charitable hospitals, particularly those in which a large number of cases of venereal diseases are treated, will be able to attest the truth of this. I have said but little in regard to the pathological aspect of prostitution or to the effect of acquired tendencies, but these are phases of the subject which undoubtedly exist, and which must be recognized.

It is necessary to say but little upon either of these topics however. The influence of the neuroses in the production of prostitution is quite as manifest as in the case of other vicious proclivities, and exerts itself in much the same manner, causing the same moral perversion in this as in other directions. The reflex derangements of the nervous system due to either functional or structural disease of the sexual organs, and attended by a deranged sexuality with its coexistent moral perversion, constitute a probable cause in some cases, as will be evident when the exaggerated results of these disturbances in the form of erotomania and such conditions are taken into consideration. With reference to acquired tendencies, it is obvious that unless proper teaching and example be brought to bear, and evil influences eliminated, a departure from the right path is quite liable to occur; and how much more potent evil influences are likely to be, if, as in the case of illegitimate children who are primarily

the offsprings of evil passions, a strong principle of heredity exists as a predisposing cause. The most prominent question arising from the considerations which I have endeavored to present in this paper, is that of the proper remedy for the prevention or diminution of the various phases of vice, as deduced from the causes set forth. It must be confessed, however, that in this respect we are not very clear, and it is not at all likely that we will ever attain any very marked results in this direction until the co-relation of cause and effect is much more definitely settled than it is at present.

It is evident that if the general bodily health has a direct influence upon the mind, the medical man can, and probably does accomplish quite as much indirectly in improving the moral status of society as can the church, or, what is often times more efficacious, that wholesome and definite dread of legal punishment which is at present the chief protection of society. Education and proper mental and moral discipline, with a removal from temptation and other malign influences, will save quite a number of individuals, even if possessed of a certain amount of inherent predisposition. Like a predisposition to disease, a predisposition to crime need not necessarily develop into actual lawlessness if proper steps are taken to prevent it.

It does not necessarily follow from the statements embraced in our consideration of the causes of crime, that punishment may not be efficacious in its prevention, even where morbid physical conditions are responsible for the evil tendencies of the individual, for even insane persons, as claimed by Maudsley, may restrain their morbid impulses where they have such a powerful incentive for so doing as the dread of commitment to an asylum. Much may be done in the right direction by the prevention of marriage between neurotic subjects, and of persons nearly related, and this is as true with relation to the prevention of crime as of insanity.

But no matter how energetic our efforts in these various directions may be, we can but hope to diminish the frequency of crime to a slight extent, and can never hope to control it entirely as long as our knowledge of the co-relation of its causes and effects is as imperfect as it is at present. We will have to accept the

inevitable, and look upon vice as we are compelled to regard certain diseases as due to causes more or less definite, but which are as yet only to a slight degree, if at all, under our control. We can, however, as suggested by the address which I have quoted in the early part of this paper, be rather more liberal with our charity and more lenient in our judgment, than if these causes were entirely unappreciated.

137 E. Madison Street.

ARTICLE III.

SECONDARY BATTERIES AND THE SO-CALLED STORAGE OF ELECTRICITY.* By ROSWELL PARK, A.M., M.D., Surgeon to the Michael Reese Hospital; Lecturer on Surgery in Rush Medical College; President of the Chicago Electrical Society.

It is but a comparatively short time since *amateurs* in general and electrical science in this country, began to hear of the so-called "accumulation of electricity" and of "storage batteries." They have been much longer known, of course, to professional electricians, many of whom have devoted to the subject a great deal of patient thought and study. As the matter stands to-day it is perhaps the most important topic at present before the electrical world, and as such is an eminently proper one for discussion in this Society. It is my purpose, then, to-night, to go briefly over the ground, giving a short account of the steps by which our present position was reached and a general idea of the *modus operandi* of secondary batteries, their construction, and of some most recent American improvements and patents covering ingenious applications of the same to actual work.

To sum up the whole idea in brief compass, it consists in storing up energy, in converting actual or potential energy into a latent form, and then releasing it again in active operation. It is well known that by proper methods any one kind of force may be converted into any other. In the ordinary galvanic battery molecular attraction or chemical energy is correlated into that

* Read before the Chicago Electrical Society, Jan. 15, 1883.

form of vibratory motion known as electricity. In the "storage battery" this same process takes place only at the expense of several correlations of the particular force originally resorted to.

Let us take the simplest form of secondary battery,—two lead plates separated from each other, each connected with one pole of a galvanic battery, say a Grenet cell, both plates immersed in water acidulated with 10 per cent. of sulphuric acid,—and study what takes place. With the passage of the current electrolytic action occurs, the acidulated water is decomposed, and the oxygen thus given off goes to the + pole or plate, which thus becomes coated with a film of plumbic oxide. When this film is thick enough the cell is in a condition to give some result. Let us now disconnect this element from the Grenet cell, and simply join the wires connected with the two lead plates. The action is then, so to speak, reversed, as follows: The metallic lead in the plate connected with the — pole, which was not covered with oxide, now acts like the zinc plate in an ordinary battery, partly giving up all the hydrogen which it has absorbed while the water was decomposing, and partly combining with the acid in the water, forming plumbic sulphate. The hydrogen thus released, and that from the acid which has been replaced by lead, now unite with the oxygen of the plumbic oxide coating the other plate, reducing it to a lower oxide, part of which lower oxide is also converted into a sulphate. When the plates are again charged the effect of the current is to convert the lead sulphate on one plate into spongy metallic lead, and that on the other into peroxide.

To state the action in different terms, it is this: Chemical action in the Grenet cell is converted into electrical energy and as such is sent into the secondary battery where, by conversion, it again becomes chemical energy, producing the changes above specified. It is this chemical energy which is stored up, and not electricity. When the wires or poles are again joined it is once more converted into electricity, ready to do any kind of work and to be transposed into heat or some form of motion.

The advantage of all this obtains just here, that this second correlation of force can be almost indefinitely postponed and commanded at will. The potential energy stored up in the secondary

battery, *minus* a certain loss, can be used or drawn upon days or even weeks after it was accumulated, though the longer this be postponed the greater the loss. Hence, the term "storage of electricity," which we see to be erroneous, as well as the term "storage battery." The strictly proper term to use, then, is "polarization," or "secondary" battery, instead of "accumulator;" though I doubt whether the phrase "storing electricity" will soon pass out of common use. The secondary current is of comparatively brief duration unless resistance be introduced, but its total energy is nearly equal to the total amount received from the charging source. Inasmuch as it is brief it will be much stronger while it lasts than the primary or battery current. How advantage is taken of this fact shall appear further along.

Knowing now what a secondary battery fully consists of, *in its simplest shape*, we can more intelligently go over a few points in the history of its development.*

Quoting partly from Morton's paper, I would mention the following facts: Gautherot noticed in 1801 that the platinum or silver wire which had been used for terminals of a battery doing electrolytic work could yield a brief galvanic current without the aid of a battery. Ritter, of Jena, in 1803 confirmed this observation, and even made what he called a "secondary pile" of discs of copper and moist paper, alternately placed. This, in a small way, had all the properties of one of our modern instruments. He experimented with many metals. Marianini, of Vienna, corrected the error of those observers who had regarded all such "reservoirs" as they would Leyden jars, and showed that this power was due to polarization.

Humphry Davy, De la Rive, and Farraday included the subject in their researches, but Grove, in 1839, made the most positive advance by showing that how a constant current was kept up for days, when two glass tubes, one containing oxygen, the other hydrogen, were lowered over the two submerged ends of a platinum wire circuit. This arrangement was known as his "gas battery." If in tubes properly arranged to form such a

* Those desiring greater detail are referred to Morton's readable paper in *Harper's Magazine*, Dec. 1882, which contains numerous references to the bibliography of the subject. Also to general works on Electricity, especially to Planté's.

battery the gases be first generated by electrolytic action, or, much better still, if in each tube be hung a piece of platinum foil, covered with spongy platinum, and connected by wires not submerged, and these tubes then filled with gases as before, a counter-current will be generated as soon as the original is stopped, and last as long as any gases are exposed to the action of the spongy platinum. Grove constructed a battery of fifty such cells, and produced effects precisely similar to those we now get, only much weaker.

Many others among original workers have devoted much time to the development of the experience thus gained, among them Wheatstone, Schoenbein, Poggendorf, Bécquerel, Du Moncel, Planté, Du Bois, Reymond, Thomson, Varley, Tait, and numerous others. But no one has done as much as M. Gaston Planté in studying the principles involved, and elucidating them for others. To him, perhaps, more than to all the rest combined, are we indebted for what we know of the matter to-day.

In 1879, Planté published his researches (*Recherches sur l'Electricité*), in which he goes over the ground most thoroughly. Planté's simple cell is the one which I have already described. The great drawback in the use of such cells is the length of time it takes to oxydize the lead, and convert it into that spongy form, in which it gives the best results. Lead does not oxydize rapidly, but requires months, or years, even, in acidulated water, and until there is, when charged, a good thick coating of oxide on one plate, and of spongy lead on the other, our cell will be a disappointment, while all the lead not so converted is, literally, a dead weight.

To form such a battery more speedily, that is, to put its lead plates in the best condition, Planté adopted this method: He found two or three Bunsen or Grove cells more effective than a large number of ordinary sulphate of copper cells. The first day the secondary battery is charged, alternately, in opposite directions, five or six times, and discharged after each reversal, the charges in each direction lasting, respectively, fifteen, thirty and sixty minutes. The last charge is allowed to remain until the next day, when the process is repeated, but each charge lasting two hours. The element is then left at rest, charged, for

eight days, after which the charge is reversed and allowed to remain fifteen days; then, for one month, two months, etc., the power still increasing, until the whole thickness of the lead plates is involved in the alternating chemical processes. The intervals of rest allow the crystalline structures of the lead time to harden before reversal of the current.

I had, in August last, the pleasure of going over more or less of this ground with M. Planté in his own laboratory, and was delighted with his results. He showed me a secondary battery of 840 test-tube cells, each with its two tiny lead plates, the whole arrangement being some years old. These were so arranged that they could be coupled either for quantity or tension. When charged side by side, and discharged in series, the differences of potential were very great. With half this battery, (420 cells), thus charged from two Bunsen cells for a very few seconds, I saw him obtain all the effects of static electricity. He also showed me a very small secondary battery, not more than ten centimetres high, which he had had in use for several years. Connecting this for twelve seconds with the two Bunsen cells, and removing it, he was able to so heat a platinum wire as to light a taper twelve times. He also demonstrated to me what he calls the "residual charge" after the element has been apparently completely discharged. In fact, in the course of a day this residual charge can be shown a number of times in one cell. What follows will serve to explain this fact.

Before going on to further consider the work of others, this seems a suitable time to note more exactly the chemistry of the changes which take place during the alternate processes of charging and discharging. The oxides of lead vary in their conducting power, the highest oxide being the best conductor. When reduction of this oxide occurs, by discharge of the battery, some of the oxygen given off undoubtedly goes to help oxydize the remaining metallic lead. This fresh lead doubtless in time assumes the same degree of oxidation as the rest, but very little of the peroxide is ever reduced to the lowest or protoxide, or it would be eagerly attacked by the sulphuric acid. The lower oxides formed by reduction are of little use for battery purposes, and their resistance is much greater; hence, the gradual loss of

battery power on allowing a charged battery to stand. Hence, also, the reason that the oxygen plate constantly increases in capacity ; and, hence, too, the residual charge.

Most of the hydrogen is either absorbed by the hydrogen plate, especially when the lead is in a spongy condition, or, as some hold, it enters into very feeble combination with it. If at any time the current be reversed from the usual order, the coating of oxide will be fully reduced by the nascent hydrogen evolved on it, and a coating of porous lead will be left. Hence, the benefit of alternating the current in "forming" a cell. This porous metal is in a much better condition to absorb and retain hydrogen. After the process of forming is complete the hydrogen plate does not increase in capacity as does the oxygen plate.

In ordinary descriptions of storage apparatus enough importance has not been attached to the varying degrees of resistance in the coatings of the lead plates. Indeed, I am not sure that the subject has been fully investigated until lately. Brush has pointed out how barriers to the free passage of the electric currents are formed, as not only the peroxide is reduced by the combination of hydrogen and oxygen *within* the mass of peroxide, thus generating water which is a poor conductor, but also by the same production of water the pores of the spongy lead on the hydrogen plate.

A great detriment to the successful operation of polarization batteries in this: the coating of peroxide on the oxygen plate occupies more space than did the original lead. This shell must expand in forming, and evidently will have a different co-efficient of expansion. The tendency then is for this coating to crack. If one side of a plain lead surface be varnished and the other side be oxydized, the side acted on becomes convex ; when the oxide is reduced the plate becomes concave. This must exert a disintegrating action on the coating and cannot but be detrimental. Finally, the coating is liable to peel off, or to be detached by liberation of gases when the charging current is too strong. Moreover, a portion of lead sulphate is formed whenever the oxide is too much reduced ; this occupies more space than the oxide and increases the above effect ; it besides, fills up the pores of the spongy mass, and is a bad conductor.

It will thus be seen that in the secondary battery of the future many obstacles are to be overcome. How far they have been surmounted in that of the present is a part of the subject now to be dealt with.

Camille Faure has studied how to "form" the elements more speedily than can be done by Planté's process, and how to reduce the dead weight,—a double problem. Planté had combined a number of plates in condenser shape, or had rolled them up concentrically, but depended on the slow process to oxydize them. Faure made the happy discovery that he could quickly prepare them by covering the lead plates with a paste of red oxide and sulphuric acid, and then rolling them up, separated from each other by strips of rubber or sheets of felt kept in place by lead rivets. This red lead is largely converted into a sulphate, and this on the first action of the charging current reduced, as before, on the one plate into spongy lead, on the other into peroxide. Faure's batteries are now often made of numerous flat plates, properly connected, covered with the paste and then insulated from each other by some woven fabric, and the whole packed in a rectangular box filled with dilute acid. However arranged, when the charging current ceases there results a condition of unstable equilibrium. When the poles are connected a vigorous current in the opposite direction is the result.

Still later, and within the year past, Faure has guarded by U. S. Letters Patent (252,002), another improvement. The electrodes are made not by formation of a spongy layer as a part of the original plain, but by the addition of a layer of active material—which may be of metal, metallic oxide or salt—which layer is capable of becoming porous or spongy—to suitable plates or supports which latter may be of non-metallic substance. This layer may be deposited with paste, cement, by galvanic action, chemical precipitation, or otherwise. In order to render the active layer more porous inert material may be mixed up with it; for example, crushed coke. It is retained by an open-work or porous medium, which allows free percolation of electrolytic fluids, but prevents separation by jarring. The retaining medium may be felt, asbestos paper, netting or gauze of cane, gutta-percha, or any suitable material. The whole space between the

electrodes may be occupied by porous material. In place of dilute sulphuric acid a solution of any salt will answer.

Prior to these last patents of Faure's, Houston and Thomson devised a different form of battery. In a proper vessel a plate of copper is suspended near the bottom. The cell is filled with solution of zinc sulphate. Near the top is a plate of carbon; the two plates being separated by a porous diaphragm. The action of the charging current is to decompose the solution, the zinc being deposited in metallic state upon the carbon. The liberated sulphuric acid attacking the copper forms cupric sulphate, whose solution remains at the bottom on account of its gravity. Connect the two poles of this cell and we have the conditions of a Callaud or gravity cell, a current being at once generated. It is an ingenious though not powerful battery.

D'Arsonval hit upon nearly the same plan at about the same time. De Pezzer claimed very great advantage for extremely thin plates of lead; but the reason for this was self-evident. De Meritens modified previous plans by folding his lead plate like the leaves of a book, and then, as it were, interleaving them. Kabadt, in order to increase surface and decrease weight, figured his plates with perforations. Ayrton proposed to decompose the acidulated water under pressure, and to utilize the extra hydrogen given off.

Rousse has constructed a very ingenious cell, his object being to employ those metals which best absorb gases. To this end he inserts in the acidulated water a plate of lead which shall be the oxygen pole, and a plate of palladium, which absorbs 900 times its volume of hydrogen. This cell is very powerful. He makes another, with one plate lead, as before, and the other of sheet iron, which absorbs 200 vols. of hydrogen—placing both in a fifty per cent. solution of ammonium sulphate.

Lastly, Maiche re-charges ordinary cells, when exhausted, by placing them in the current of an ordinary dynamo, it being well known that Leclanché cells, for example, can be thus recharged.

None of these devices, however, with the possible exception of the palladium cell, excel a well-formed Planté element. To turn now to what American talent has lately accomplished in this direction, the following claims or specifications of patents are certainly worth notice:

Brush patents (263,756) an alloy of lead with a non-oxidizable substance, upon which an active absorptive coating is applied. Another patent of his (264,211) covers a device for placing in a bath numerous plates or elements of lead, connected with the oxygen pole of a generator and a single electrode of lead or copper connected with the hydrogen pole, by which the former are all charged, or coated with oxide. They can then be removed, and placed in individual cells, all ready to charge and discharge. One action then suffices to reduce into spongy lead the coating on the plate to be used as the hydrogen plate, and to assist in the formation of the coating on the other. He has further patented (266,090) a method of ribbing the plates, so that they shall better hold the coating they are to receive, and expose a larger surface.

Eaton's patent (266,114) covers the treatment of skeleton plates in a solution of metallic salts, as, for instance, plumbic acetate, in the presence of zinc, by which, the zinc having a greater affinity for the acetic acid than the lead, the latter is obtained in spongy form upon the plates. These plates are then coupled up as usual to form the battery.

W. A. Shaw's patent (266,262) includes these improvements: an addition to the lead, or lead oxide of sulphur, and the preparation of the two into a paste with sulphuric acid; a solid compound or salt which is soluble, and whose solution is an electrolytic fluid, as a filling between the electrodes, when mixed with some porous material; and a special preparation of the electrodes with potassic nitrate or similar salt, to render them more active. For this latter purpose, they are dipped into a saturated solution of saltpeter, removed to dry, and then repeatedly dipped and dried; all of which gives them a sort of glaze. He further makes the electrodes tubular, so that a current of cold air may be passed through them while they are being charged, to overcome elevation of temperature. Twenty parts of red lead to one of fine sulphur, or equal parts of white lead and sulphur, used as a coating, give good results. For instance, if a coiled or serpentine tube be used as an electrode, this coating is pasted into all the interstices before being finally glazed. For porous filling, sand or sawdust, mixed with any of the alkaline nitrates, or zinc sulphate, or various other salts, may be employed. Shaw has also discovered that an

alloy of bismuth and lead, say 1-10 of one per cent. bismuth, is an improvement on pure lead. He makes all his tubular electrodes with a core of pure lead and an outer surface of this alloy.

Blanchard's plan (267,138, is for concentric leaden cylinders, with perforated tubes in annular spaces between, said cylinders being so raised as to give outlet below, and a filling of granulated lead or oxide of lead packed into the annular spaces.

Starr (267,275) would mix finely divided active material, as red lead, with a non-active material, which, being brought into a plastic or fluid condition, sets or hardens in a porous condition without artificial heat. Finney's patent (267,860) covers the use of leafy, flaky or fibrinous lead.

Starr has taken out another patent (268,308) later than Faure's, which differs from it in this respect: the active material applied to the plate is mixed with fiber or filaments, in contradistinction to pulverized coke or sawdust, whereby the porous mass is held more securely. Each plate electrode is provided with plates extending through it, for escape of surplus gas, and is separated from the others by a porous partition. At the top of the case containing the whole is an automatic valve, worked by an electro-magnet, for surplus gas to escape, and regulated by the current.

Eaton, also, has very recently patented (268,360) an element somewhat resembling that of Houston and Thompson. His combination is of an electro-negative element of spongy lead, a solution of cupric sulphate, and a positive element of carbon, or carbon and metal, in a finely divided state and loose.

After this consideration of the construction and working details of secondary batteries, the very important question arises, as to what their capabilities are. The statement has already been made, that there was a certain loss. What is the amount of this loss?

MM. Tresca, Allard, Le Blanc, Jubert and Pottier, made a report to the French Academy, whose main points may be thus summarized: (*Parville, "L'Electricité et ses Applications."*) A battery of 35 secondary cells, weighing each 43 kilos., in all about one and a half long tons, was charged by a Siemens dynamo of one and one-half horse power for nearly 23 hours; or equal to

one horse power for 35 hours. Of this power, 34 per cent. was sheer waste in overcoming friction and in useless work, while 66 per cent. was sent into the battery. Of the full amount sent into the battery, 60 per cent. was recovered in the form of electricity. In other words, of 35 hours' work into a ton and a half of storage battery, 14 hours' work could be made actually available; or enough, as Morton puts it, to run twelve of Edison's eight-candle lamps for fourteen hours. Or, to put it in yet another shape, there were 35 cells, and 35 hours of one horse power expended, that is, a horse power for each cell. Each cell received 270,000 kilogrammeters of energy, of which it yielded in return 40 per cent., or 108,000. Each kilogram of lead thus gave up 2,500 kilogrammeters of actual force.

But since this investigation, much better results have been achieved. M. Planté has measured the amount of working force returned from some of his best formed elements, and found it to be 88 to 89 per cent. Hospitallier also has had better results. Gladstone and Tribe have carefully studied the causes of loss, which they find to be local action between the lead plate and the peroxide deposited on it—already alluded to—and the resistance of the lead compounds to the passage of the current, by which energy is correlated into other than the desired form. By properly adapting the constituents and regulating the discharge, and by "resting" the battery, Ayrton and Perry have recovered 82 per cent. of power put into these cells.

These latter results are far better than those yielded by the experiments of the French committee, and are an indication of the amount of energy we may legitimately expect these secondary batteries to yield back. I have no doubt that the battery of the near future will steadily yield 80 per cent. of energy sent into it.

General interest in the subject may justify me in concluding with an exceedingly brief resumé of a very few of the recent United States patents, covering applications of secondary batteries, which seem to deserve notice on account of their ingenuity or serviceability.

T. A. Edison (Pat. 218,167), makes the statement that when a secondary battery is fully charged decomposition of the

liquid commences, and gases are developed. He arranges two secondary elements so that one may be charged by a dynamo, while the other is doing the active work of, say, lighting a series of lamps. When the first one is completely charged, and the decomposition of gas has begun, the gas given off operates an automatic switch, and shunts the charging current on to the battery which is nearly exhausted, while the one which is completely charged is by the same movement switched into the discharging circuit. His claims cover the use of the gases thus given off, and for this purpose, and the whole general arrangement, as above.

W. L. Voelkler has patented (251,748) a device for preventing waste of energy in a circuit of, say, electric lights. He introduces a series of secondary batteries so automatically connected that all energy given off by the dynamo above a certain and necessary amount is stored up in them; whereas, if for any reason the energy of the generator falls below the required amount, the force stored up in these cells is at once brought into play, and thus the current is kept constant. This is accomplished by means of a strip of metal running over an insulated pulley and loaded with a weight, which plunges into a reservoir of mercury. The metal strip and mercury are part of the main circuit. Excess of energy heats the strip and elongates it, allowing the weight to descend and displace the quicksilver, which rises in another tube, and makes contacts which switch off part of the current into the secondary batteries. On the other hand, if the metal strip becomes too cool, it, by a reverse action, throws the secondary batteries into the main circuit.

H. B. Sheridan has another device (253,435) for a similar purpose, but particularly intended for lighting railway cars. The dynamo is connected with the running-gear. He inserts an automatic switch, whereby the main circuit is broken when the charging current becomes weak, or stops, in order to prevent the current passing back from the storage cells to the generator. Instead of a strip of metal, as in the previous system, he has a series of lever switches actuated by cores, drawn into magnet helices, as the strength of the current varies.

C. E. Buell patents (255,248) a mode of preventing waste of

the charge of a secondary battery, when the generator, which charges it, is either at rest or in slow action. Were this not prevented, the energy accumulated in the storage box might return to the generator and be virtually lost. He has a developing and a charging circuit. When the dynamo is first started up, electrical power is quickly developed, and when sufficient speed is attained the current is turned off, either automatically or by hand, and on to the charging circuit.

Buell also patents a scheme something like this (255,249) : A charging circuit, two series of secondary batteries, a working circuit common to both, a switching device for alternately connecting one series in the charging circuit, the other in the working circuit, and an arrangement by which the series being charged, are *coupled for quantity*, the series being discharged for *intensity*.

In still another patent (259,362), Buell makes this combination quite effective for lighting cars, each car being provided with switching devices, and two series of secondary batteries, those being charged being coupled for quantity, and those working the lights, for intensity. Moreover, the storage boxes may be thrown entirely out of the circuit, and the charging current made to do the work of lighting.

In conclusion, then, secondary batteries are not universally applicable, but within certain limits their value will prove—in the near future—very great. As regulators and equalizers of powerful currents, in numerous domestic and professional applications, and as a means of economizing in the first cost of large plants they are without a visible rival. For instance, a one-horse power dynamo, intended to run for twelve hours, in storing up a charge, is much less expensive than a twelve-horse power machine, intended only to run an hour, while, in many cases, running the former will be found little or no more expense than the latter. In Paris, if the writer remembers aright, and in other cities, a company will charge up small accumulators for an evening's lighting, calling for them next day, and leaving freshly charged ones, and for a very small sum.

The patents which I have summarized in this paper will serve to give an idea of the number of services to which secondary

batteries may be put. We must remember that, as applied for commercial purposes, this matter is still in its infancy, and that great improvements and additions may be expected in its scientific front. The little instrument with which I show you a few results to-night is as a scientific plaything, when compared with the immense surface of lead offered in some of the polarization batteries now in actual use for electric motors and lights.

In all that I have said to-night, I feel that I have not been able to do justice to the industrious talent of Planté and others (to whom all honor), nor to throw that electric light upon the subject which it deserves; but I venture to hope that I have shown that it is one which has, literally, a most brilliant future.

1558 WABASH AVE.

ARTICLE IV.

A CASE OF POLYDIPSIA, COMPLICATED WITH CHRONIC SPASMODIC ACTION OF THE STOMACH. By D. D. MARR, M.D., Chesterton, Ind.

Mrs. W., farmer's wife, aged forty years, mother of several children, complexion light, disposition rather hysterical—has been an invalid for ten years, the last three passing most of the time in bed. Weight, 115 pounds; very nervous, and has the general appearance of continued suffering.

She was quite intelligent, and informed me that she had been affected with the diseases for which she had called me to treat for three years, with but slight remissions.

During this time she had had several medical attendants to examine and treat her, no two of them agreeing as to their diagnosis, and none of them affording any relief. The last was a respectable practitioner of fifty years, who, after several visits, informed her that he was yet ignorant of her diseases, and discontinued his treatment.

On examination, I found her pulse 115, small and thready; appetite very limited, bowels constipated, tongue not much coated, but dry and fissured; great thirst, drank from one to two

gallons of water per day, and passed urine in large quantities; sp. gr. 1,008, which, on several examinations, contained no sugar.

I was not a little surprised to hear gurgling, plashing and whirring sounds of confined liquid issuing from the region of her stomach, and with such violent action as to jerk and agitate her whole body, which she was unable to restrain.

On uncovering her abdomen, nothing unusual as to contour was noticed, excepting a slight fullness over the gastric region. Within the abdominal wall, and in the region of the stomach, and, in fact, the stomach itself, were all manner of writhings, twistings, and contractions in connection with the liquid sounds I have described.

Thinking that I could restrain the movements, I applied my hands firmly in various positions over the stomach, but with only partial success. I could very distinctly feel the contortions of the stomach and movements of the liquids therein.

She would frequently drink a half-pint of water, and immediately the movements and liquid sounds I have described would increase vigorously, and with great discomfort to the patient.

One homœopathic physician had diagnosed three or four snakes in her stomach, and prescribed fasting, so that the reptiles would hunger and crawl out.

Diagnosing her disease according to the heading of this article, I administered treatment as the indications required. Her hygienic and dietetic conditions were put in as favorable condition as her humble circumstances would permit, and tonics were freely given. Opium and its preparations were given even to a degree of narcotism, relieving the pain, but not the spasmodic action of the stomach. Anti-spasmodics had no appreciable benefit. Bismuth sub. nit., in drachm doses, three or four times daily was the only remedy that gave any relief, partially controlling the spasmodic action and allowing more ingestion of food. With a view of giving quietness and rest to the stomach, rectal alimentation was resorted to, but with no material benefit, as the constant desire for liquids could not be supplied per rectum.

She passed out of my observation for three or four months, when she again sent for me. She informed me that she had

improved considerably, and that she could take nourishment and digest it with more comfort and less spasmodic action of the stomach, but that the disease was "moving downward."

On examination, I found the lower region of the abdomen enlarged, and she stated that there was movement connected with the enlargement. On examination, I found this due to pregnancy, which, in due time, terminated favorably. After the termination of gestation her condition improved, the spasmodic action of the stomach was but slight, and the quantity of fluids ingested was greatly lessened.

I have searched the medical literature in my possession, but have failed to find a reported case of chronic spasmodic action of the stomach.

May not the falsely reported cases of movements of snakes, lizards, and other reptiles in the stomach be due to a chronic spasmodic action of this organ, as in this instance. If so, we can easily explain away such reports. In this case, the continual drinking of large quantities of liquids was undoubtedly a great factor in the spasmodic action of the organ.

THE Hungarian medical journal, *Gyogyaszat*, publishes an interesting but not very aesthetical extract from an old *materia medica* for the year 1564. This *materia medica* appeared under the title: *Connumeratio portarum cottus Saladiensis anni 1564, Summa facit portas turcis non subjectas No. 89½. Turcis vero subjectas No. 364½*. Among the prescriptions are the following: Against toothache, powder the tooth of a hanged man, mix it with lard, and rub the aching tooth; it will fall out immediately. Against jaundice: Wash your posteriors very cleanly, and give the patient the water to drink before breakfast. Against stone in the bladder: Give the patient seven living lice in honey at the time of the declining moon. The whole extract shows the ignorance of the public and the learned in those times, but there are now prescriptions used which will be ridiculed a hundred years after us.

Society Reports.

ARTICLE V.

MICHIGAN STATE BOARD OF HEALTH.

(Reported for the CHICAGO MEDICAL JOURNAL AND EXAMINER.)

The regular quarterly meeting of the Michigan State Board of Health was held at its office in Lansing, Michigan, on Tuesday, January 9, 1883, the following members being present: Hon. LeRoy Parker, of Flint, President; Henry F. Lyster, M.D., of Detroit; Rev. D. C. Jacokes, of Pontiac; J. H. Kellogg, M.D., of Battle Creek; Arthur Hazlewood, M.D., of Grand Rapids; John Avery, M.D., of Greenville, and Henry B. Baker, M.D., Secretary.

The subject of oil-inspection was brought up, and it was stated that it was alleged that much oil is being sold without being inspected, partly because of there not being enough inspectors, and partly because of the system of payment for inspection, which allows a man to receive large pay for his labor performed during the first of the month, and toward the last of the month, when the fees get smaller, the work is not done. The object to be attained by the inspection should be to ensure that the oil used by the remote farmer in his cottage, should be as safe to use as that in the city, near the inspector; and it was represented to the Board that the cost of inspection could be reduced from \$27,000 to \$12,000, and yet have all the oil properly inspected, but not without employing more inspectors than are now employed. Dr. Hazlewood and Dr. Baker were appointed a committee to take such action as was considered necessary on the subject of the inspection of oils.

The secretary made his report of work during the last quarter, mentioning the efforts to prevent the introduction of contagious

diseases by immigrants; the distribution of blanks and circulars to officers of local boards of health, providing for their annual reports; the general distribution of the Annual Report of the Board for 1881; the issuing of a circular by Drs. Kellogg and Avery, with a view to collecting all facts respecting the cause and spread of diphtheria; the preparations for a sanitary convention at Pontiac, commencing January 31; the preparation of articles embracing facts collected respecting contagious diseases in Michigan; also one giving what has been learned by the immigrant-inspection service; also a paper read before a convention at Jackson, on "The Relations of the State Board of Health to Corrections and Charities." A resumè of the work of other State Boards of Health was also presented. It showed that in three counties in California, small-pox had been introduced by immigrant cars. The authorities provided an inspection, and have for the present stopped the introduction of this loathsome disease. In Michigan, the expense of small-pox inspection is much greater, on account of the large number of immigrants, and the secretary claimed that the national government should continue to provide means for such inspection, and thus protect the people from Maine to California. Senator Conger and Representative Rich have introduced in Congress bills to appropriate \$25,000 to enable the National Board of Health to aid State and local boards of health to prevent the introduction of contagious diseases, and their spread from one State into another, by means of the immigrant-inspection service. After reading the above-mentioned bill, the following resolution was passed:

WHEREAS, This Board has long been laboring for the restriction and prevention of contagious diseases in Michigan, which depends greatly upon the existence of such diseases in other States and countries; and as this Board has been able to trace several outbreaks of disease in this State during the past year to immigrant travel, etc., therefore

Resolved, That this Board of Health urgently requests our members of Congress to endeavor to secure the passage of a bill to appropriate \$25,000 for the remainder of this fiscal year, and thereafter at about the same rate, to enable the National Board of Health to coöperate with State and local boards of health and quarantines in efforts to prevent the introduction of contagious diseases into the United States, and their spread from one State to another.

The invitation to hold a sanitary convention at Reed City sometime in the spring was accepted.

Analyses of apple-butter, and of the tinned-copper, such as is used to make wash-boilers, were presented. The apple-butter is often made in such "copper" boilers when they are new. The acid of the fruit attacks the tin, which often contains lead in dangerous quantities, and it is said that the tin lining is eaten off in one or two times using for making apple-butter. The analysis of the apple-butter showed distinct traces of lead and tin, and a faint trace of copper. That portion of the apple-butter in contact with the cap of the fruit jar in which the apple-butter was sent to the chemist gave very strong reactions for zinc, doubtless derived from the zinc caps which screw down upon the mouths of "Mason" fruit jars. The specimen of tinned-sheet copper used in making "copper" boilers, and other kitchen utensils, was analyzed, and the "tin" was found to contain a large quantity of metallic lead; about two-fifths of the "tin" was lead. From one square foot of such tinned surface there was obtained the equivalent of 150 grains of metallic lead. The ordinary clothes-boiler, such as used in our kitchens, if made of this "tinned-copper," would have two and one-third ounces of metallic lead on its surface, an amount that must have a serious influence on persons who eat acid fruits and juices boiled in such a vessel. Dr. Hazlewood and Dr. Baker were requested to make an investigation into the subject of metallic poisoning by utensils for cooking and storing food. The city of Hillsdale, Michigan, now requires burial permits. While this subject was under discussion, Hon. Geo. Howell, M.D., a member of the Committee on Public Health, of the Present House of Representatives, read a proposed bill to promote the public health. He received the thanks of the Board. The subject of requiring burial permits and thus securing mortuary statistics before removal of the body of deceased persons, was referred to the Committee on Legislation, with the request to prepare a bill and submit it to the Legislature. The Board adopted a resolution commending the effort to secure mortuary statistics before the burial or removal of the body of a deceased person; and declaring that the method is applicable to townships and villages as well as to cities.

Many letters from prominent sanitarians in this and other countries were presented which spoke in a very appreciative manner of the work of this Board.

It was moved and carried that local boards of health be recommended to supply physicians and persons acting as such, with blank notices of diseases dangerous to the public health printed on postal cards.

The Committee on Legislation reported on an act requiring the registration of plumbers. Hon. James Heuston, M.D., Senator, spoke on the subject of the examination of new dwellings before occupancy, and the following resolution was offered by Dr. Baker and adopted:

Resolved, That the Committee on Legislation, etc., and the Committee on Buildings, Public, Private, etc., jointly, be requested to take into consideration the feasibility of the suggestion made at this meeting by Hon. James Heuston, M.D., for a State law requiring all plans for new dwellings to be submitted to the local Board of Health for approval.

The Committee on Disposal of Excreta was requested to prepare a pamphlet for general distribution, on the disposal of slop-water, garbage, etc., in villages without a sewerage system, and from detached dwellings.

The American Public Health Association has recommended making it a penal offense to communicate a contagious disease. The Committee on Legislation was requested to modify the bill so as to name diphtheria, scarlet fever, and small-pox, and get the subject before the Legislature.

The Special Committee on Sanitary Conventions reported that a Sanitary convention was to be held at Pontiac on January 31 and February 1, 1883. Among the subjects to be presented, are papers on the Limitation and Prevention of Typhoid Fever, the Relation of the Medical Profession to Public Health Laws, on Toy Pistols, the Dangers in Dirt, and on the Contamination of Well Water.

The following resolutions (two of them having been passed before) were reaffirmed:

Resolved, That there should be required of all who are to begin the practice of medicine in this State an examination as to their qualifications.

Resolved, That such examinations by the State should be restricted to questions in demonstrable knowledge as distinguished from questions of mere opinion.

Resolved, That, as a public health measure these two resolutions be referred to the President and Secretary, with a request to do what they can to further the objects of the resolutions.

Auditing of bills and other routine business was performed. The next meeting of the Board will be at Pontiac, January 31, and the next regular meeting will be April 10, 1883.

DR. THOMAS WATSON died December 12, 1882. He was in his ninety-second year. He is perhaps best known for his classical work on the Practice of Medicine. It is not too much to say that no other work of similar extent upon this subject has ever so charmed every reader. On Friday, the 15th instant, the remains were conveyed in a plain coffin of polished oak, without other covering than a floral cross, from the residence of his son to the burial-ground attached to the Reigate parish church. At the entrance of the churchyard the procession was met by the clergy and a surpliced choir, who chanted the opening sentences of the service. The greater part of the service, including the singing of the two well known hymns, "Lead Kindly Light," and "Ten Thousand Times Ten Thousand," was performed within the church. There was afterward a procession to the grave, the bare earth of which had been concealed from view by a lining of evergreens and flowers. Among those forming the procession were the son and heir of the deceased, Sir Arthur Watson, Lady Watson, Miss Watson, the two sons and two daughters of Sir Arthur and Lady Watson, and Captain Watson, a nephew of Sir Thomas. The medical attendants of the deceased were all present—namely, Dr. Walters, Dr. George Johnson, Mr. Lister, Dr. Greenhow, and Dr. Holman. The College of Surgeons was represented by the President, Mr. Spencer Wells, and the College of Physicians by the Registrar, Dr. Pitman. Sir William Jenner wrote to express his regret that he was unavoidably prevented from attending.

Domestic Correspondence.

ARTICLE VI.

ELGIN, JAN. 30, 1883.

S. M., age about fifty-five years, while spading in his garden in this place, the ground being dry and hard, ruptured himself very severely. This occurred on the 20th of last May. It appears that it was an old hernia, right inguinal, as it had appeared once before, but not so bad, and he had been wearing a sort of home-made truss. The method adopted, as I was informed, to reduce it before, had been to stand the patient on his head, or nearly so, holding him in that position by two men, while the surgeon of St. C. manipulated to reduce the hernia. This method of procedure doubtless impressed those present as being a very scientific way of doing it. The method adopted by me was to have the hips of the patient well elevated in the bed; I administered to him a brandy toddy, applied an ice-bag over the extent of the tumor, leaving this on forty minutes; by this time all pain had disappeared. I then, with both hands extended over the tumor, commenced a firm and steady pressure in the direction of the inguinal ring, reducing the hernia in about thirty minutes. This hernia was immense, extending down between his thighs, obliterating penis and scrotum, or involving them in the swelling so as to leave no natural appearance. Dr. B., homœopathist, was present with me, being a brother-in-law of the patient.

H. ROSENCRANS, M.D.

Reviews and Book Notices.

ARTICLE VII.—MICROSCOPICAL MORPHOLOGY OF THE ANIMAL¹ BODY IN HEALTH AND DISEASE. By C. HEITZMANN, M.D. Late Lecturer on Morbid Anatomy, at the University in Vienna. With 380 Original Engravings. 8vo., cloth, pp. 849. New York: J. H. Vail & Co. 1883.

This is a great work whose merits cannot be ascertained by a mere perusal, and yet one could not extol it as a valuable *text-book*. To a great many it will remain but a stupendous contribution to the science of histology, which is in its infancy though a robust child. A large part of the book was written ten years ago, and consists of a translation of previous papers by the author, too much of it being mere discussion. The effort of Dr. Heitzmann at demolishing the cell doctrine is like that of the socialist to do away with the government. In both cases the narrow mind of man fails to see the compatibility of a foundation with a superstructure.

The cell theory is one of the greatest modern scientific achievements, a resting platform in the stairs of knowledge, and the merit of Dr. Heitzmann's researches is this, that he has shown that the *cells* have a regular ground-work which former investigation had not seen. Another advantage of the book, most of the illustrations are original, as they should be in such cases, though a great many are diagrammatic, which is hardly excusable in works on microscopy.

In the preface, the author refers to the support he received from a wealthy friend. This is a detriment, for we live in an age when practical scientific books are in such demand as to pay for the publication; except, perhaps, when a writer tries to make

a text-book of an aggregation of previous pamphlets. The 12 pages devoted to methods are very practical, and one wishes that a longer space had been given to the subject. The chapter on the General Properties of Living Matter, is extremely crude compared with the treatment of the same subject by Hadley, in his "Anatomy of the Invertebrate Animals," or Spencer, in his "Biology." The net-work of which cells ultimately consist is described in chapter iii. as observed by the author in examining amoebæ with a 1000 power. It is well to state here that other observers have failed to discover such structure, but in this as in other cases analogy suggested the discovery and it was not made through the help of the best lenses, though it is doubtless a most important one.

The substitution of tissue *elements* for *cells* is only misleading, and the old term should be preserved for many obvious reasons.

The communication on "The Structure and Origin of Colored Blood-Corpuscles," by Louis Elsberg, forms one of the most valuable and interesting chapters. Dr. Heitzmann's work is well adapted for those students who are particularly fond of investigations rather than memorizers of known facts, and several views of the author will certainly stimulate microscopists to more accurate observations. Besides, a careful elimination of a good deal of useless material, would make a valuable text-book of what seems incongruous matters in this first edition. The printing as well as the engraving leave no desideratum.

ARTICLE VIII.—A MANUAL OF OBSTETRICS. By A. F. A. KING, M.D., Professor of Obstetrics and Diseases of Women and Children in the Medical Department of the Columbian University, Washington, D. C., and in the University of Vermont, etc., etc. With 58 Illustrations. 12mo, cloth, pp. 325. Philadelphia : Henry C. Lea's Son & Co. 1882.

Of all the manuals issued of late in the various departments of medicine, none compare with this. It is the clearest, neatest, most complete and most interesting work on the subject of which it treats, and it seems that Prof. King has succeeded in conveying in its chapters the wonderful interest which attached to his lectures when delivered before his attentive students.

Although the author has often published valuable contributions to the science of obstetrics, his greatest glory is the magic affection with which all his students remember him, and his aim in dedicating his book to them has been to make a book which answered their wants in every particular, and in that he has entirely succeeded.

This volume is much more thorough than a first glance would reveal, for it comprises even obstetric jurisprudence, while, by a system of condensation peculiar to Prof. King, one wonders at the number of facts expressed in a paragraph, and at the numerous details of treatment conveyed in half a page. The illustrations are remarkable for their accuracy, and this volume is issued in the best style of the well-known publishers.

Although best intended for students, this book is also very useful in the library as a reference work, for it contains all the essentials of the larger works on the subject, besides many original suggestions. And the treatment is everywhere exhaustive. This volume also possesses the rare merit of slipping inside an overcoat pocket, so that it can easily be taken along to the bedside, where accoucheurs sometimes have to pass such weary hours if they have no reading matter at hand.

H. D. V.

ARTICLE IX.—THE PHARMACOPÆIA OF THE UNITED STATES OF AMERICA. Sixth Decennial Revision. By authority of the National Convention for Revising the Pharmacopœia, held at Washington, A. D. 1880. 8vo, pp. 488. New York: William Wood & Co. 1882.

On the whole, this edition will be very satisfactory to the greatest number of readers. The introduction of abstracts of various drugs forms a convenient mode of administering them. So the triturations with sugar of milk.

The preparations of opium in this new edition are stronger than in the former, and will be a source of misunderstandings between prescribers and druggists until both become accustomed to the change. Most of the ingredients of compounds are taken as so many parts in a hundred; in some both the metric and the old systems are used. A great many fl. extr. syrups and trs.

have been added, but comparatively few new remedies. Every drug appears in alphabetical order, with a prominent name, and a great deal of blanks. In fact, it is probable that the high price of the book, in which these blank spaces occupy such prominence, will prevent its general use by prescribing physicians. This book could have been issued in a more economical manner. However, an objection of a totally different character will be made by many to the small type used in describing many substances. More plain type and less *leading* would have made a prettier and more useful volume.

As it is, nevertheless, it forms the best reference book in prescription writing. It is indispensable to druggists, and it is the *materia medica* recognized by the law so that it is indispensable to most physicians.

It is issued in a variety of styles, to answer the wants of druggists especially.

H. D. V.

ARTICLE X.—ANATOMICAL TECHNOLOGY AS APPLIED TO THE DOMESTIC CAT. An Introduction to Human, Veterinary, and Comparative Anatomy. By Burt G. Wilder, B.S., M.D., and Simon H. Gage, B.S. (Both of Cornell University). 8vo., cloth, pp. 575. New York and Chicago: A. S. Barnes & Co., 1882.

A timely and most valuable work on anatomy. This is certainly the most practical book on the subject, and it will prove of the greatest benefit to those who pursue their study alone, or dissect without the help of a demonstrator. The large number of Latin anatomical terms used, while easily acquired by a short study of the language, impart to the subject a sort of international homogeneity which cannot be too highly commended. Although the greatest attention is given to the anatomy of the cat, this manual is the best work available on the dissection of any mammal, and must form the best of introductions to human anatomy. However, as medical students have but little time to give to dissection while pursuing the study of medicine, and as the anatomy of man is the only one that they can ever master, they should not make the mistake of entering the profession with

nothing but a smattering of the anatomy of the cat, and, therefore, we would not recommend the introduction of this work in the medical colleges of this country. But, for those physicians who dissect whenever an opportunity offers, who are interested in comparative anatomy, or practice vivisection, this is the best hand-book. With naturalists at large, a rapidly growing class in this age, a want long felt has just been filled, and it is probable that it could never have been filled in a better manner, except, perhaps, for the wood-cuts.

ARTICLE XI. — PATHOLOGICAL ANATOMY. Pathology and Physical Diagnosis. A Series of Clinical Reports, Comprising the Principal Diseases of the Human Body, Systematically Arranged in One Hundred Full page Illustrations and One Hundred Pages Text. By I. A. JEANCON, M.D. Progress Publishing Company, Cincinnati. Twenty-five Parts. Price \$1.00 per Part.

We have before us, Section One of this promising publication. It treats of diseases of the cerebro-spinal axis and its membranes, beginning with sub-arachnoidal meningitis of the cortex and surface of the brain (comatose form).

Table One illustrates beautifully, by eight chromo-lithographic figures, three well reported cases of cerebral arachnitis.

Table Two illustrates, in an equally artistic manner, by four figures, the post-mortem appearance of a case of hemiplegia, with excessive pain in the limbs and epileptiform spasms; two cancerous tumors of the dura mater; gelatiniform softening of the cerebral substance.

Table Three illustrates, by six admirable figures, tumors of the falx cerebri, and the accompanying text gives the histories of two cases from which the specimens were obtained.

Table Four contains four figures, that represent, in an equally creditable manner, acute meningitis of the cerebrum and cerebellum, and the text gives complete histories of two cases from which the illustrations were obtained.

We can emphatically commend this work to the profession.

D. R. B.

ARTICLE XII.—ESSENTIALS OF VACCINATION; A Compilation of Facts Relating to Vaccine Inoculation and its Influence in the Prevention of Small-pox. By W. A. Hardaway, M.D., Formerly one of the Vaccine Physicians to the City of St. Louis, etc. 12mo., cloth, pp. 146, \$1.00. Chicago: Jansen, McClurg & Co., 1882.

Of the various valuable contributions made to the subject during a few years this seems the best and most practical. It comprises chapters on the history of vaccination, vaccine in animals and in man, complications, etc., revaccination, merits of different kinds of virus, etc. It is terse and thorough, not encumbered by technicalities, and it is issued in very good style. While of great value to the profession, this monograph is also very well adapted for the people at large, especially in these days of anti-vaccination crazes.

COOK COUNTY HOSPITAL.—Dr. Jas. M. Hutchinson is giving an excellent surgical clinic every Tuesday at the hospital. His dissertations show that he has within him the elements of a successful clinician.

Dr. F. Henrotin is giving an acceptable medical clinic every Tuesday.

Dr. A. J. Baxter is conducting a surgical clinic every Friday. There is no medical clinic on Friday.

It is a matter of great regret that so many of the present medical staff of the hospital have no capacity for and no experience in medical teaching, and that, in consequence, the abundant material is not used as it should be to encourage the progress of medical education in Chicago. Chicago is the great medical center, as it is the great commercial center, of the Northwest, and the county commissioners should see to it that competent teachers, as well as capable practitioners, constitute the Hospital staff.

Translations from Foreign Exchanges.

BY O. STROINSKI, M.D.

A CASE OF SYPHILITIC GUMMA IN THE LIVER.

Marie G., fifteen years of age, is very imperfectly developed, and she has suffered for years from scrofula the consequences thereof having been grave lesions in the pharynx and palate with difficult voice, and partial loss of vision by repeated kerato-conjunctivitis. At last she lived in very poor circumstances. A few months ago, she lost some blood through the vagina, and this was thought to be menstruation. She suffered then from severe pains in the back and abdomen, and she noticed a swelling of the latter which increased rapidly, and she was thought to be pregnant. A physician examined her, and declared her to be seven months pregnant, and he sent her to the women's hospital. On examination, the cervix was found normal and very small, hymen intact, pregnancy excluded. The abdomen was very much distended the subcutaneous veins visibly enlarged, and there was palpable in the abdominal cavity a great amount of fluid (ascitic). The liver was enlarged to such a degree that the lower part could be palpated in the region of the umbilicus. The appetite was diminished, there were colicky pains in the abdomen, and she always suffered from diarrhoea. There was no fever or icterus. The patient was put on a diet of milk, and she seemingly improved, but soon all the symptoms returned with repeated vomiting. An aspiration of three liters of the fluid was made, and it was found to be highly albuminous. After repeated aspirations the patient died. The following autopsy showed the organs of the thorax to be in a healthy state, the

peritoneum highly inflamed, the uterus and ovaries very small. The very enlarged liver shows an atrophy of its right lobe which is situated in the vertebral cavity, but the left lobe is hypertrophied and forms the greatest part of the organ. The surface shows a general perihepatitis with adhesions to the neighboring parts. The gall-bladder is atrophied and reduced to the size of a small prune, its cavity being inflamed and containing but a little yellowish mucus; the great biliary ducts are permeable. The sections of the liver show the tissue to be firm and consistent and its aspect resembles that of a cardiac liver, the most remote lobules from the center being yellow and fatty, those of the superficial layer red and highly injected. The capsule of Glisson is very small. On the end of the left lobe, the tissue resembles that of the spleen, and the central fatty spots have irregular and ramified folds. In cutting through the small branches of the left liver, there is found on the posterior margin of the liver on the point where the subhepatic veins unite with the vena cava, a small tumor of fatty and translucent tissue resembling caseous substance. The tumor is a true gumma of the liver, and its cicatrix has enveloped in its retraction the two subhepatic veins; it has caused their absolute obliteration, the vena cava presenting a depression without any permeable orifice. This singular lesion explains the alteration of the liver, and it resembles most vividly the cardiac stasis, the cicatricial retraction having caused a veritable ligature of the two principal subhepatic veins. The other organs, and especially those of the genital apparatus, being in contradiction with symptoms of recent syphilitic infection, it is probable that the infection has been caused by vaccination, or that it is a case of hereditary syphilis.—*France Médicale.*

SALIVARY FISTULA OF THE CANAL OF STENO WITH A NEW SURGICAL PROCEDURE.

If there is made, from whatever cause, a fistula into the integument of the canal of Steno, there will always be a permanent salivary fistula, with not the slightest tendency to reparation, and only an operation will close the fistula. The number of opera-

tions for closing the fistula is very large. Dr. Richelat has invented a new procedure which is very simple and which can be applied in all cases. The following cases will show the results of this new operation. A woman, forty-two years of age, had been shot in the right side of the face, twenty-five years ago. There is now an ankylosis of the temporo-maxillary articulation, the teeth cannot be opened more than one millimeter, the food can be introduced but in small particles, and mastication is impossible. There is also a salivary fistula on the most remote parts of the duct, and of the external surface, of the left masseter. This fistula has undergone several changes. There has been formed an abscess opposite to the fistula which broke into the original fistula and there remained a permanent aperture as a new fistula. A scar of the original fistula is now visible, one opening 3 cm. below that from an abscess can be seen, and another opening forwards on the buccinator from which the saliva flows constantly. Considering the anterior orifice of the abscess as the true fistula, the following steps of operations were made: A trocar was plunged into the fistula and an exit was made on the buccal mucous membrane on the point where the canal of Steno regularly runs. A canula was then introduced, so that the end of the canula occupied the anterior margin of the new canal and not entering the fistula which was closed by sutures. Thus the saliva took its regular course into the buccal cavity and the posterior aperture healed of itself. In two months' time the cure was perfected.—*L' Union Médical*.

POTT'S DISEASE, PARAPLEGIA, RAPID SPINAL EPILEPSY.

The patient, a young man twenty-three years of age, noticed first rheumatic pains with a slight fever. Three days afterwards his limbs became paralyzed, and he says that he does not know of any cause of the disease, but that he had to walk a good deal. He had no pains, neither in the chest, back or limbs, but then he noticed that he could not stay on his legs. On entering the hospital the legs are found to be bent on the trunk and the flexor muscles are contracted, so that it is impossible to straighten the legs, except with great force and under severe pains. Micturition is painful and there is constipation. The patient can but

slowly move his body on the bed. The movement is specially difficult on the left side and there is apparently spinal epilepsy. There is trouble in sensation, with pains in the limbs and formication. He complains also about pains around the waist, and there are points of complete anaesthesia, especially on the upper part of the limbs. He mistakes the sensations of heat, cold, contact etc. There is a vertebral curvature reaching to the fifth dorsal vertebra, but which the patient has never noticed. He died, after a few days, from complete asphyxia. The autopsy shows intramuscular abscess, near the fifth dorsal vertebra. The body of the latter is entirely destroyed and in its place is a caseous mass which has entered the dura mater. The spinal marrow consist of a blackish substance which is rigid and resistant. This mass is also found in the pia mater of the brain and in the cerebral hemispheres, reaching to the interhemispheric fissure. There had been, doubtless, a pressure on the spinal marrow.—*Progrès Médical.*

A CASE OF SYPHILITIC KERATITIS.

The patient, thirty-four years of age, a very muscular and healthy looking man, has been attacked by syphilis with hard chancre, in the year 1870. The present disease dates four months back. The eye became reddened and there were symptoms of photophobia. Varying pains set in with aggravated disturbance of vision. The palpebral conjunctiva is inflamed, the eyeball is injected especially in the pericranial region. The vessels are enlarged and there are seen vessels invading the cornea. This membrane is opaque and the limits of this opacity are diffuse. The iris of the healthy eye is blue, but that of the left side so far as visible is yellow. The pupil is small and there are probably posterior synechiae. The diagnosis is syphilitic parenchymatous-irido-keratitis. The patient complained often of headache with gastric symptoms and he collapses after two weeks. In the brain there are found in the left hemisphere two gummata. The diseased eye is put in Mueller's solution for two months. The cornea shows a blackish thickening originating from the anterior chamber, and there are folds running from the periphery to the center. The iris is slightly pigmented and its

two zones, the central and the peripheric, show prismatic eminences. On the total dissection including the not detached cornea, are noticed: 1. An enlargement of the episclera; 2. A declination of the angle of the iris on the posterior surface of the cornea; 3. The corneal tissue is swelled by a blackish mass and there is ablation of the vitreous membrane. There are three synechiae on the anterior capsule connecting it with the pupil.—*Lyon Médical*.

THE VENOMOUS APPARATUS OF THE SCORPION.

The venomous apparatus of the scorpion is formed by the last abdominal segment and it is curved, pyriform and highly colored. It has two small ducts from which the poison is ejected.

To understand the structure of the apparatus it is necessary to make several transverse incisions. The venomous glands are two in number. Each gland is placed in a cavity which it fills entirely, and the anterior part of which is formed by striated muscular fibres, which can be moved voluntarily by the animal, pressing on the gland and thus separating the poison. Each gland consists of a tegument and a central cavity, which serves as a reservoir for the poison. The tegument is composed of two layers: 1, A fine layer consisting of cellular tissue and muscular fibers, it presents on its internal region lamella-like prolongations which serve to augment the secreting surface; 2. A cellular layer which is composed of prismatic epithelium lining the internal part of the first named layer and the folds of the second one. These epithelial cells are filled with protoplasm, and they contain in great abundance, fine arrayed granulations characteristic of the poison of the scorpion, and which are especially visible on applying acetic acid. The poison escaped by the rupture of the cells and it is accumulated in the central cavity. The venom of the scorpion is a very active poison and its effects are characterized by two phenomena: 1. That of excitement; 2. That of paralysis. One drop of the poison injected into the cellular tissue of the rabbit kills the animal in time of a few minutes. The probability is that the poison acts on the brain and spinal cord.—*L'Union Médicale*.

TEMPORARY LOSS OF VISION BY PAPILLITIS IN PREGNANT WOMAN.

The patient, a Mingrelian lady, sixteen years of age, has been married three years, and she is now pregnant the third time. She is a brunette of gracile figure; well nourished, and healthy appearance. Four months ago she complained of headache and nausea. After a while the vision became impaired, and palpitation of the heart troubled her, to such an degree that she could find no rest. There was a sensation of heat from the waist up to the chest; throat and head, and the face became very often intensely reddened, but without sweat. The patient being in the seventh month of pregnancy, danced a great deal and took from three to four bottles of strong wine daily. The day before she became perfectly blind she was at a ball, and danced all night. In the three years of marriage she has been but six months free of the pregnant state, and she suffered all this time from nervous affections (*globulus-hystericus*, *hystero-epileptic* attacks, etc.) The conjunctiva is not hyperæmic; the pupils slightly dilated; temperature normal. The ophthalmoscopic examination of the right eye was not possible, on account of pain and reflex symptoms, from the slightest rays of light. The left eye showed the retina in state of hyperæmia and inflammation; the veins grossly enlarged. The treatment consisted of absolute rest in a dark room, abstinence from wine, coffee, etc., and a depletion of blood from the temples. After a few days the headache disappeared, and after a week the patient could read common letters. The patient used spectacles of dark glass and took the usual rides in the carriage. The case has to be classed among the neuroses caused, probably, by the repeated cessation of menstruation in such a young body (or some flexion of the uterus), with irregularities in diet.

—*Memorabilien.*

THE ETIOLOGY OF HÆMORRHAGIC VARIOLA.

Last year four Esquimaux died in Paris from hæmorrhagic variola. These patients were young and strong, and not addicted to alcoholism. The autopsy showed the liver enormously enlarged and in complete fatty degeneration; the mesenteric ganglia very developed, the kidneys of extreme volume,

fattily degenerated, and the heart in the same condition. It was then believed that the nutrition of these persons, consisting mostly of oil and fish, had aggravated the symptoms of the variola. It is a fact well known to surgeons that fatty degeneration of one of these organs provokes very often haemorrhage, and it is further known that variola excites these organs to fatty degeneration like scarlatina, icterus, typhus and other pernicious diseases. Haemorrhagic variola happens to occur mostly in debilitated persons, drinkers or pregnant women where fatty degeneration of one or more organs is always present. In the autopsy of persons who died from haemorrhagic variola, the liver is always found to be fattily degenerated and icterus is always present. The kidneys are altered in this disease to a higher degree than in any other disease. The visceral alterations are not of the importance ascribed them hitherto. It seems rather probable that these lesions have been present more or less before the disease attacked the patients, and that they are in some cases the cause of the rapid and malignant course of the disease. Sometimes there had preceded other zymotic diseases.—*Union Médicale*.

TOTAL DEVIATION OF THE STOMACH INTO THE LEFT HYPOCHONDRIAC REGION IN A CASE OF CANCER OF THE PYLORUS.

Marie D., a woman seventy years of age, has always had, as she asserts, an "iron" health, and she has menstruated to sixty years of age. But one year ago she began to suffer from digestive troubles, with diarrhoea and alternating constipation. Three months after she noticed a tumor in the abdomen, and severe pains set in, with entire loss of appetite. The lancinating pains made the administration of morphine necessary. The tumor was situated at the left side of the linea alba, 12 cm. below the false ribs. It was movable, as hard as cartilage, and of the size of an orange. There was no ascites, and there never was vomiting during the entire course of the disease. In the autopsy, the stomach was found to be distended with gas and liquids, and it was considerably deviated. In fact, the great transverse diameter of the stomach is vertical, and the pylorus is situated on the left side, kept there by many adhesions, which fix it to the angle of the transverse colon and the descending

colon. The intestinal ansæ agglomerated about the pylorus were formed by the colon transversum and those of the ileum. All the adherent ansæ were atrophied by encircling peritoneal folds. The pylorus was in cancerous degeneration, the liver fatty, the venæ saphenæ and femoral of the right side were obliterated.—*France Médicale*.

RHEUMATIC OSTEITIS.

M. Ladiat insists that there are different lesions from the same constitutional cause. Thus, rheumatism affects the bones, the ligaments and the synovial cavities. Osseous rheumatism, or rheumatic osteitis, is anatomically characterized by a considerable swelling of the bones forming exostoses and stalactites. The periosteum is also thickened in certain cases. The osseous tissue is friable, and it has all the histological phenomena of a new generation of bone; osteoplastic layers arranged regularly on the surface of the meshes of the calcareous material passing to the state of characteristic osseous elements. The vessels are augmented and dilated, the spongy tissue predominates. In this disease opposite bones forming an articulation will be attacked. The head of the tibia for instance will have an enlargement thus protruding from the condyle of the femur. The soft parts are as to healthy movements limited and accompanied by crackings due to formation of stalactites. Certain diseases which have been hitherto classified as arthrites will have to be classified anew. This rheumatism is developed in healthy muscular persons who have never suffered from any other rheumatic disease, and cardiac troubles have been observed in this form of rheumatism.—*Revue Médicale*.

THE ACTION OF QUININE ON THE HEART.

In typhoid fever, large doses of quinine are applied in every civilized country of the world, and it should therefore appear a necessity to publish everywhere the action (often fatal) of quinine on the heart. Small doses of quinine, given at intervals, produce two different actions on the heart. In the first period, the action of the heart is augmented, its contractions more forcible, and the flow of the arterial blood more violent. In the second period,

there is a marked decrease, *i. e.*, the pulsations are more irregular in rhythm and force, and there is a tendency of arresting the heart. There is an inhibitory phenomenon following over-irritation. In large doses, the first phenomenon does not appear, but all the symptoms of the second stage appear, with stupor and collapsus, and suppression of the contractions of the heart. Thus are explained the reported cases of sudden death in typhoid fever treated with large doses of quinine. Besides that, the sulph. of quinine is very seldom pure, but it is mostly mixed with forty to fifty per cent. of the sulph. of cinchonine, which has a more deleterious effect on the heart than quinine.—*Revue Médicale.*

SARCOMA OF THE TONSILS CURED BY INJECTIONS WITH IODOFORM.

The patient, a man sixty years of age, suffered from sarcoma of the tonsils, with swelling of the glands of the neck. Billroth and others declined to operate, whereupon, Weinlechner of Vienna, ordered the injections with iodoform, which cured the patient entirely. The case is as follows: The patient noticed the swelling of the tonsils in the year 1881. He then went to Billroth, who told him that the case was incurable, and that he would not operate on it. He then went to Albert, who first promised to operate, but later refused. He then saw Weinlechner who found a tumor as large as a lemon and ulcerated in the left tonsillar region, and another tumor deeply situated and as large as an orange, in the angle of the lower jaw. He was inclined to operate with the permission to make a resection of the jaw, but which the patient refused. He then sent him to Dr. Lebaum who cured the patient by sixteen injections with iodoform. The injections caused a chronic gastritis and later a catarrh of the lungs, and they had to be made in great intervals. To-day there are but eight scars in the tonsillar region and on the arctus palato glossus.—*Memorabilien.*

THE SECRETING EPITHELIUM OF THE KIDNEYS IN THE BATRACHII.

The published works on general anatomy and histology have not fully demonstrated the structure of the epithelium of the

kidneys in man. Dr. Bonillot has made investigations on this epithelium in the batrachii. The tubuli uriniferi of this kidney consists of five distinct segments, but from all these structures the second is the most important, and it corresponds with that of the tortuous tube of the uriniferi. This epithelium is composed of polyhedric cells without any cuticulum, but having a broad band on the free surface. These cells contain granular striated matter, and very fine fibrillæ resembling the inter-cellular net, of Klein. The meshes of this net contain a hyaline substance in the interior, and the above-named band is probably due to a condensation of this substance. On some points it is detached in the form of spheric masses, which will be found in the urine. In the normal state there are but a few of these cells, and they are only active cells.—*France Médicale*.

LEUCOPLAKIA BUCCALIS.

This disease, also called psoriasis of the tongue and buccal mucous membrane is a chronic squamous affection of the dorsum of the tongue and the lips, characterized by white elevated spots and superficial induration of the mucous membrane. It is mostly found in persons having been affected by syphilis of the mouth, or in persons addicted to the use of tobacco. But sometimes it is found in persons neither syphilitic nor smokers, and then there are seen round erythematous spots, looking very red, but, later, blackish, and which undergo desquamation. If the disease has continued for several years, there are large, grayish spots, which become black and are thrown off in lamellæ 3 cm. long. Then there is cicatrization with the new formation of epithelial cells, and the surface of the tongue becomes broken and fissured in different directions. At last the tongue shows several elevated points, which look like the papillæ of the tongue of a cat. These points are confluent, and they form at last the true epithelioma.—*L'Union Médicale*.

FISSURE OF THE ANUS AND RECTUM IN A CHILD.

The child, thirteen months old, and very emaciated, suffered from constipation, with slight haemorrhages from the rectum, and from convulsions on the left side of the body. The child

passed, under severe pains, every eighth or tenth day, a mass of hard faeces, whereupon the child became unconscious. Then a bloody-tinged mucus separated from the rectum, with contractions of the sphincter ani. Three to five days before this event, the child suffered from chorea on the left side of the body. After the passage, these convulsions disappeared, and did not return during the next three or five days. The attacks had begun five months previously. The exploration under chloroform showed a fissure of the anus and rectum seven mm. long and three mm. wide. The fissure was divided and healed by iodoform. The hemichorea never reappeared, and the bowels began to move regularly.—*Wiener Med. Wochenschrift*.

THE METALLIC TUBES OF LEITER AS REGULATORS OF TEMPERATURE.

To regulate the temperature of a certain part of the body our means are very insufficient. A bladder filled with ice, a cata-plasma, etc., have been hitherto applied to produce this effect. Leiter, at Vienna, has manufactured flexible tubes of zinc, which can be adapted to any part of the body. A rubber tube is connected with one orifice of the tube so that the latter may be filled with water of any temperature. From the other orifice the water flows out into a basin. The tubes can be applied to the throat, chest, foot, etc. A thermometer is attached to the rubber tube for the regulation of the temperature. A kerosene lamp is used for heating the water in a vessel which is attached at one side to the rubber tube and at the other to a pitcher with water. The temperature can be kept according to the needs in the especial case.—*Progrès Médical*.

THE AUTOPSY OF GAMBETTA.

Much is said about the autopsy of Gambetta, and the curiosity of the people has been satisfied by the report of an autopsy. The brain has been weighed, and a report was made of several parts of this decomposing body, the stench of which was so penetrating as to make Paul Bert faint like an old woman. But the *mise-en-scène* is deficient; there is, in fact, no actual official report of an autopsy. The wound was cicatrized; but where

was the wound? in the arm, or in the abdomen? In the absence of all other explanations, we are inclined to believe that it was in the latter region, *i. e.*, there was a purulent infiltration of the abdominal gland, and a profound abscess behind the colon. We hope that the enlightened physicians who made this autopsy will throw more light upon this point.—*Revue Médicale*.

PURPURA RHEUMATICA.

J. F., thirty-seven years of age, suffered from rheumatic pains in the knee-joints, the arms and the chest. Swelling around the joints appeared, but when this ceased, purpura appeared on the lower limbs. The gums bled easily. Then the joints of the right arm began to swell, and the purpura appeared here. After five days, the joints of the left arm began to swell, and there was immediately an eruption of purpura. The eruption was formed by haemorrhagic spots, which, when opened, discharged a bloody fluid. Black spots remained for a long time.—*Med. Chir. Centralblatt*.

THE WEIGHT OF THE BRAIN IN MENTAL DISEASES.

Dr. Bra has made a series of investigations on this point in the Asylum of St. Anne. The result, he says, is that in mental diseases the brain weighs a little more than usual, and the circumference of the cranium is also a little larger. But the weight is changing with the intellect which the person possessed. The brain of epileptics does not weigh more than that of a healthy person. In mental diseases, there is always a difference in the weight between that of the right and that of the left lobe.—*France Médicale*.

The *Progrès Médical*, speaking in its student number about the colleges of the different countries, says that most of the colleges in the United States could be closed to the advantage of the people. This is rather rough on us, and we have but one consolation, *i. e.*, that the average French medical college, except that of Paris, gives no better opportunity to the medical student than those of our country. The better colleges of the American College Association can well compare with those of France and Italy.

DR. CLEMENCEAU, the admirable leader of the left wing in the French Assembly, has a good practice in Paris. Sitting one day in his office busily engaged with the registration of the patients whom he had prescribed for, a young man entered the office and the doctor ordered him to take off his coat. The young man took off all his clothes, and the doctor, looking suddenly at the nude figure of the strong and healthy man cried out: "What in heaven's name do you want?" "I would ask you for a position in the post office," the young man replied. Tableau.

THE ACTION OF STRYCHNINE ON DILATATION OF THE HEART.

Patients who had a well stated dilatation of the heart took strychnine daily, and the diameter of the heart was measured daily. The results are as follows: 1. After one or two days, the enlargement decreased so that considerable enlargement disappeared. 2. If the use of strychnine is suddenly stopped, the enlargement will reappear. 3. From two to three mmgrm. sulphite of strychnine daily are sufficient to produce these results.—*Wiener Med. Wochenschrift*.

ELECTRICAL TREATMENT OF EPIGASTRIC PAINS IN HYSTERIA.

These pains, which are mostly accompanied by severe vomiting, have been successfully treated with the galvanic current by Dr. Apostoli. The positive pole is applied in the subclavicular region and the negative pole over the seat of the pain. It is continued for 5 to 15 minutes and it is said to have stopped the vomiting entirely. The gastralgia and epigastric pains have been stopped after ten to fifteen applications.—*Revista Medico-Quirurgica*.

THERE is a revival of the old box-theory in generation which had been nailed up by Haller two hundred years ago. According to this theory Eve had all the coming generations in her two ovaries incorporated as one box is inclosed in the other.

THE Argentine Republic gives liberal "stipendia" to young physicians who have excelled in their examinations, and they are thus enabled to go abroad and finish their studies in Europe.

Selections.

THE EXCITING CAUSE OF ATTACKS OF HYSTERIA AND HYSTERO-EPILEPSY. By GRAILY HEWITT, M. D., London.

Hysteria is a subject which has often and repeatedly attracted the attention of physicians. Hitherto it cannot be said to have been thoroughly elucidated. In attempting to deal with so wide and important a subject, and in offering a contribution towards the settlement of certain vital questions relating to hysteria, I trust I am not guilty of too great a presumption.

In the first place, I desire to present a synopsis of the subject of hysteria, in order that I may be able more clearly to define the position which my observations have induced me to take on the etiology of hysteria.

Synoptical view of the etiology of hysteria and hystero-epilepsy :—

- A. Condition of nervous centers. 1. Unduly impressional.
 - a. Emotionally. b. By reflex action. 2. Actually diseased.
- B. Presence of peripheric irritation. 1. In uterus. 2. In ovary. 3. Elsewhere.

Hysteria may be, according to this synoptical view, either "centric" or "peripheral" in origin. It is also evident that there is no absolute incompatibility in the two views.

It has long been a matter of belief—dating, in fact, from the Hippocratic era—that irritation in the generative organs plays a very important part in the production of hysteria.

Gynaecologists, who have most knowledge of the truth of this idea, have not, however, up to the present time been able to define precisely the *modus operandi* and the exact nature of the irritation in question.

Assuming that the hysterical manifestations, convulsions, etc., seen in women are brought about by the irritations of the sexual organs, the initial difficulty presents itself as to which of the two organs, the ovary or the uterus, is mainly responsible.

So far as hysterical convulsions and hysterical symptoms are concerned, the opinion held by some authors—Negrier and Charcot—is in favor of the view that the ovaries are the *point de départ*.

The observations of Charcot are most interesting, and the phenomena of the hysterical paroxysm have been described by him, and still more recently by Richer,* in a manner which leaves little to be desired so far as the outward manifestations, convulsions, spasms, anaesthesia, paralysis, temporary intellectual disturbances, etc., are concerned. And these delineations are also most complete in regard to the manner in which the manifestations in question are capable of being modified or influenced by the action of *external agencies*. The ebullition, as it may be termed, has, in short, been pictured in a most graphic manner.

Circumstances have led me to investigate the various hysterical manifestations observable, from an etiological point of view. I had no predisposition to take any particular view of the matter, and it was only by repeated observation that I became convinced that the uterus is generally in a state of irritation in cases where these manifestations are observed; thus, in fact, confirming the more ancient theory of the subject. And I was induced to take this view of the influence (etiologically) of the uterus from the circumstance that in cases where the two conditions were conjoined—viz., uterine irritation and liability to attack—the attacks always appeared to cease on removing the irritation. In fact, experience revealed to me that in the course of treating the disorder of the uterus, the liability to hysterical attacks ceased. Further observation showed that the peculiar irritation productive of hysterical symptoms and attacks was always one and the same—viz., a flexed and distorted state of the uterus. Since I first became aware of this relation I have omitted no opportunity

* "Etudes Cliniques sur l'Hystéro-épilepsie ou Grand Hystérie." Par Dr. Paul Richer, Paris: Delahaye. 1881.

which has occurred to me for verifying and repeating the observation. Cases of this kind now referred to, do not present themselves with great frequency; cases of marked hysterical paroxysms, so far as my experience goes, are not very common, but during the last ten years, during which I have been testing the matter in question, several instances have fallen under my notice; and as yet the facts I have collected are strictly confirmatory of the truth of the above generalization.

There appear to be two classes of cases:—

1. Those in which the attacks are induced primarily by some strong emotion—the reception of distressing news, a fright of any kind, a severe mental shock, etc. Here the operation of the causes is a direct action on the central nervous system, which in such cases may or may not be weakened in some way, and predisposed, or not, to be affected by an excitement acting from without. These cases are undoubtedly met with in practice, but they seem to be rather rare.

2. Those in which the attacks are induced primarily by a reflex disturbance from within, and quite distinctly so. This class of cases is numerically far more frequent than those classed in the foregoing list. They include cases in which the hysterical manifestations are severe, and more or less constantly liable to occur.

Now, the evidence which I have been able to collect, to me convincingly shows that the reflex irritation causing these attacks and other hysterical manifestations is an irritation having its seat in the uterus, and that the particular irritation most potent in producing the reflex disturbance is flexion of the uterus. This view is one which I expressed about twelve years ago.

In the course of my professional experience, I have only met with cases which seemed to be cases of hysteria produced in the reflex manner, and I have seen none in which hysteria of a severe character has been brought about emotionally. I do not deny the existence of the latter class of cases (certain of M. Charcot's cases, for instance), but it so happens that I have seen none. On the other hand, I have met with many cases coming under the former category, and in such cases, the uterus was found to be the cause of the symptoms; the facts of the cases,

the results of treatment and the whole phenomena of the cases in question, indicating in what has seemed to me a most unmistakable manner that this view of the case was a correct one.

What the precise nature of the condition of the uterus is which is capable of giving rise to such remarkable manifestations is a matter of great interest. The results of my observations have led me to the conclusion that in these cases the uterus is in a condition of what may be termed traumatic congestion, by which is meant that the blood current is forcibly arrested in the tissues of the uterus. The common cause of such arrest in these cases is compression of the organ at its center by the bending or flexion of the uterus. There occurs as a result, acute congestion of the body of the uterus, which becomes aggravated by certain movements and diminished by others. Whence it happens that exertions capable of increasing the flexion, are found to bring on the attacks or other hysterical manifestations, while, as a rule, rest and the horizontal position are equally potent in removing them or in preventing their occurrence.

The word "traumatic" seems suitable as explaining the nature of the congestion present under these circumstances.

The intensity of the traumatic congestion present in different cases appears to vary, but its main characteristics seem to be the same in all instances that I have observed. And the worst and the severest cases of hysterical convulsions have been those in which the degree of traumatic congestion of the uterus was actually greatest.

There is another etiological moment present—viz., the compression of the nervous filaments of the uterine tissue at the precise spot where the flexion compression is greatest. When the uterus is forcibly flexed, such compression occurs.

I have here the model of a section of the uterus constructed in sponge.* The model is six times the normal length of the uterus, but the thickness of the walls and the due relation of the parts are carefully preserved. The model is constructed in order to exhibit the effects of acute flexion of the uterus on the uterine tissues. It will be observed that when the sponge uterus is bent

* The model was here exhibited by the author, and the action of flexion on the uterus illustrated by its means.

so as to imitate the change of shape observed in acute flexion of the organ, the sponge is greatly compressed and squeezed together on the concave side of the bend. The model thus enables us to understand that the center of the uterus is the seat of great compression in cases of flexion, which compression is increased by increase of the flexion. The sponge model also serves to illustrate the production of traumatic congestion, for the compression due to flexion is the cause of the interference with the circulation of the uterus.

Whether the traumatic congestion of the uterus or the flexion compression is the more important in giving rise to reflex hysterical manifestation, it does not appear to be easy to determine. Possibly both moments are important. And it may be that the presence of traumatic congestion operates in inducing hysterical phenomena by virtue of the compression of the uterine nerves in those parts of the uterus which are actually the seat of the congestion.

The accompanying drawings represent flexions of the uterus severe in degree. Fig. 1, shows a third degree of anteflexion of the uterus. Fig. 2, represents the uterus in a case of retroflexion in the third degree. The seat of the compression is principally the wall of the uterus on the concave side of the flexion.

I adduce in support of the views now enunciated a series of eighteen cases, arranged in chronological order, observed by me

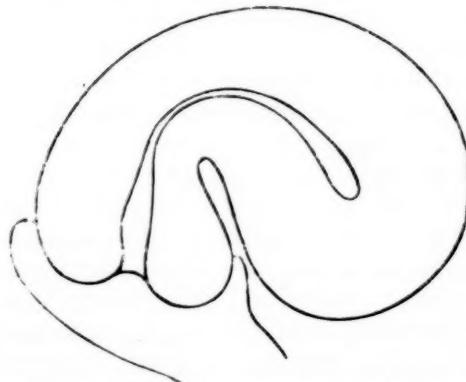


FIG. I.—Anteflexion of Uterus (Third Degree).

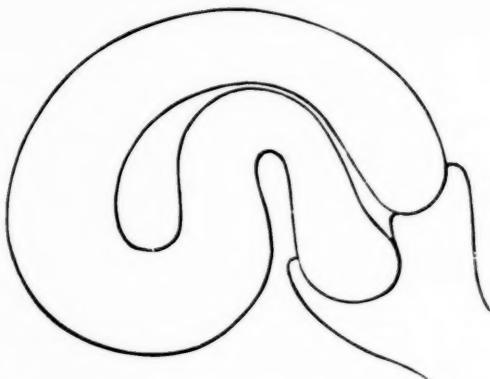


FIG. II.—Retroflexion of Uterus (Third Degree).

during the ten years from 1870 to 1880. I have observed other cases also, of which records have not been kept. The following series are all of which I have kept records. There are six cases in which the uterus was retroflexed, and twelve in which anteflexion was observed.

CASE I. Chronic retroflexion. Severe hysterical attacks.—Mrs. —— had been liable to frequent severe hysterical attacks, after which she usually remained in a state of quasi-insensibility for some time, ever since her first confinement, which occurred upwards of twelve years previously. Latterly severe sickness had occurred. The uterus was found acutely retroflexed. There was an absolute cessation of the hysterical attacks from the time the treatment of the retroflexion was commenced.

CASE II. Acute anteflexion of the uterus. Almost entire suspension of menstruation for two years. Severe hysterical attacks.—The following is an abstract of the case which is more fully published in the third edition of my work on "Diseases of Women." The patient was single, æt, nineteen, a dressmaker. Two years ago became attacked with "hysterics," at first severe, afterwards less so. On one occasion she lost her voice for five months. Has had lately a peculiar cough. Menstruation only once in the two years. While in the hospital had several severe hysterical attacks, strong convulsive action and attempts to beat

her head on the floor, sometimes several in the day, and a peculiar cough resembling that observed in laryngismus stridulus. The uterus was found to be in a state of acute anteflexion. A stem pessary was employed. The attacks at once became less frequent. In a month she was made out-patient; fits ceased. Two months latter pessary removed, complete cure and return of menstruation.

CASE III. Acute anteversion of the uterus. No menstruation. Severe epileptiform attacks.—For fuller particulars of this case see third edition of my work on "Diseases of Women." The patient was single, æt. seventeen; never menstruated. For ten weeks has had fits, as many sometimes as twenty in the day. In service since age of ten years. Pains in hypogastrium and frequent micturition for four months. Uterus anteverted. Sound easily introduced. Cradle pessary introduced. A month later the fits had become reduced in frequency, and she left the hospital. Menstruation appeared about two months after commencement of treatment and was followed by a complete cessation of the attacks.

CASE IV. Acute anteflexion of the uterus probably of one year's duration. Convulsive attacks occurring frequently during that time.—The patient was married, thirty years of age, had one child four and a half years ago. Health tolerably good till one year ago. Six weeks nursing a sick child appears to have made her ill. The illness began with an attack consisting of slight loss of consciousness for a moment, then convulsions. Since that time has had two attacks—two or three a day as a rule; the attacks last a short time, are not accompanied with loss of consciousness as a rule, and during the last three months have become more intense; menstruation had also ceased for three months, but has just occurred again once. The uterus was found acutely anteflexed. A cradle pessary was applied, the sound used to straighten the uterus. The attacks became at once reduced in frequency and intensity. During the first four days had altogether eleven attacks; during the succeeding ten days only five attacks; altogether she was under observation for seven weeks; the attacks latterly only occurred once in two or three

days, and were very slight, while menstruation had occurred a second time rather profusely.*

CASE V. Retroflexion of the uterus. Hysterical attacks following exertion.—Mrs. ——, æt. nineteen, married fourteen months. Has had no child. Suffers from hysterical attacks, and her medical attendant believed her to be affected with retroflexion of the uterus.

It appears that four years before marriage she had a severe attack of scarlet fever, which left her so weak that she did not walk for one year, and then began with crutches. Since recovering from this attack she has been liable to what are termed hysterical attacks, following any exertion.

Menstruation is profuse and too frequent. The uterus is soft to the touch, very distinctly retroflexed. A pessary was applied.

The patient completely recovered, and had a child two years afterwards.

CASE VI. Acute anteflexion. Severe hysterical attacks.—Mrs. ——, æt. thirty-four. Has been married fifteen years; has had no children. Menstruation always painful. Has had bearing-down for years. Ten years ago had St. Vitus's dance, not severely; but has occasional symptoms on and off, such as nervousness for an hour or two when excited. Six months ago had been nursing, for five months severely, and began to feel excessive bearing-down and strangury, became insensible for a week, and urine had to be drawn artificially. Had also acute pain in abdomen and hypogastric region, the difficulty in passing water continuing. She had severe convulsions at intervals during the time. Ever since this time she has had severe attacks of what are termed "strong hysterics" after any slight fatigue. Uterus in a state of acute anteflexion. A cradle pessary was applied. Relief. Later history not known.

CASE VII. Retroflexion of the uterus. Hysterical attacks.—E. J., a cook, single, æt. twenty-six. Three years ago was under treatment for uterine affection. Has suffered for some time now from hysterical attacks, which last for about twenty minutes, and

* Fuller particulars of this case in *Lancet*, August 7, 1875.

during which she becomes unconscious. The last attack came on during the singing in church, and she had to be carried out.

Uterus retroflexed. A pessary applied. Cure.

CASE VIII. Slight anteflexion of the uterus. Attacks of convulsions. Mrs. ——, æt. thirty-three, had four children, the last born six years of age. Six months ago had a convulsive seizure, following a course of nursing and over-exertion. The convulsions produced a kind of opisthotonus. She was conscious throughout, but could not move for ten days. Since this attack has occasional twitchings. No sickness. Easily tires from short walks. Uterus a little anteflexed. Sound enters with difficulty. Treatment, rest. Result, favorable.

CASE IX. Acute anteflexion of the uterus. Suppression of menstruation. Severe hysterical attacks.—Miss ——, æt. twenty. Has always been weak and delicate. Menstruation began at twelve.

Two years ago she bathed in the sea just before the time for the period, and it did not, consequently, occur. She became very ill, and menstruation did not occur for three months. Since that time she has been liable to severe hysterical attacks, and to frequent threatenings of attacks. There was a further catching of cold five months ago, and the menstruation has not occurred since, with one exception.

The uterus was found very low down in the pelvis, and anteflexed. A cradle pessary was employed. The hysterical attacks ceased, but the patient remained for some time in a weak condition. Finally, restoration to health. The hysterical symptoms did not recur.

CASE X. Retroflexion of the uterus. Hysteria.—Miss ——, æt. forty-one. Had a fall from a horse twenty years ago, and has been ill ever since. Treated for hysteria for a long time. It was discovered, nine months ago, to be a case of retroflexion, by Mr. Palmer, of Nayland, Colchester, who has nearly succeeded in restoring the uterus to its proper place, and she is now much better.

CASE XI. Acute anteflexion of the uterus. Severe hystero-epileptiform attacks.—Mrs. ——, æt. twenty-one. Married

three years. Ill since six months after marriage. Is subject to severe hystero-epileptic attacks. These chiefly occur after sitting upright, as at meals. They are very severe, and the general disturbance is very acute.

The uterus is in a state of acute anteflexion and much tilted forwards. There is very great tenderness of the epigastrium and of the back, particularly at three special spots.

The flexion and displacement were treated by the sound and a cradle pessary. The attacks were relieved at once, and have not returned since.

CASE XII. Acute anteflexion of the uterus. Severe convulsive attacks.—Miss —, æt. thirty-eight. Out of health one year. Had an attack of bronchitis, on recovering from which she had a succession of severe nervous attacks, on one occasion being for five or six hours unable to speak, move, or show any signs of life, but was all the time conscious. There were many other severe attacks. For three or four months could not sit up one hour, though she could walk a little. Has not improved the last three months. To quote the patient's own description:—“There is constant pain in the back, almost constant sickness or nausea, occasional violent retching brought on by walking or even talking. Any exertion of mind or body produces clinching of the hands, and a horrid feeling all over the back and back of the head. Menstruation regular, but extremely painful, and inability to move at these times increased. Feels very often faint, and a sensation then begins in the brain. She feels that she cannot speak, and is very unlike herself. On recovering, feels as if she had been some one else all the time, or as if she had two selves, one quiet and sane, the other idiotic.”

Severe anteflexion of the uterus. Treated by a cradle pessary. Complete cure.

CASE XIII. Acute anteflexion of the uterus. Severe convulsive attacks just previous to menstrual periods.—Miss —, æt. twenty-eight. Has suffered from severe convulsive attacks since menstruation commenced. These attacks appear generally just previous to menstruation. They have been considered due to disease of the brain.

The attacks are of the following kind:—The eyes become fixed on the ceiling, the teeth clenched, the back arched and rigid, the limbs also contracted and set. There is incapability of speaking, but the patient knows what is going on. The skin is deadly cold. The attacks last from an hour to an hour and a half. The patient was found to be suffering from acute anteflexion of the uterus. She was treated for this by a cradle pessary and occasional use of the sound. After three months the attacks had become greatly lessened in frequency. Half a year elapsed before the patient was next seen. The attacks had disappeared. A slight sensation of faintness only was occasionally observed at times. A year later, still free from attacks. The anteflexion of the uterus was difficult to cure in this case, but the final result satisfactory.

CASE XIV. Retroversion and slight flexion of the uterus. Convulsive attacks about menstrual periods.—Miss —, æt. twenty-nine. Four years ago began to suffer from convulsive attacks which always came on about the second day of the menstrual period. She remains insensible about half an hour (once in two days) after the attack. Has had five attacks. Has had much exertion in lifting and nursing. Uterus markedly retroverted and a little flexed. Treated by pessary. Cure.

CASE XV. Acute retroflexion of the uterus. Severe hysterical attacks. Mrs. —, æt. thirty-eight. Has had no children. About one year ago began to have severe hysterical attacks, with screaming and much excitement. Occasionally every word excites the sensation of an attack coming on. Formerly could walk well. Walking power now very much more limited.

Uterus acutely retroflexed, extremely sensitive to the touch. Treated by the sound and by a Hodge pessary. One year afterwards she stated that she had had no more attacks, and was in all respects feeling quite well and strong.

CASE XVI. Uterus anteverted.—Hysterical attacks. Mrs. — æt. thirty. Four children. Hysterical attacks and pain after exertion. Uterus anteverted, wearing a Hodge pessary, the overaction of which has produced anteversion of the uterus, or exaggerated it.

CASE XVII. Anteflexion of the uterus. Hysterical attacks.—Mrs. ——, æt. twenty-four. Three children. Two years ago began to have hysterical attacks, with pains in the head, and dullness. Since last confinement, five months ago, the attacks are more frequent. The patient has a frequent choking sensation. She is obliged to stand a good deal.

Uterus low down, anteflexed; fundus close to symphysis pubis. Treated by a cradle pessary. Cure.

CASE XVIII. Anteflexion of the uterus. Hysterical attacks and severe sickness. Miss ——, æt. thirty-three. Five years ago lifted a heavy weight, and fell ill in consequence. Two years ago began to suffer from sickness. The sickness has been almost incessant ever since. Dysmenorrhœa also of late. For the last four months has been subject to fits of insensibility. The head feels strange; she lies down and knows no more for some time—once for as long as twenty-four hours. When she returns to herself has much aching of the jaws. Uterus very low down, larger and anteflexed. There is great tenderness over right ovarian region. Very severe and troublesome sickness almost constantly present. Treated by cradle pessary. Great improvement, sickness subsided, attacks ceased. Pessary removed one year and nine months later, when the patient seemed well. Five months later, return of symptoms and re-employment of cradle pessary.

The cases above related, coupled with others which I have seen, but of which I possess no sufficiently good records, have induced me very decidedly to come to the conclusion that it is the uterus which is the seat of the irritation, which issues in the hysterical attack. The manner in which the attacks originated, the circumstances attending the subsequent occurrence of them, the relief, and in many cases the instantaneous manner in which the attacks ceased when the uterus was straightened and put into its proper position in the pelvis—the facts and observations, repeated over and over again have forced this conclusion upon me.

The occurrence of hysterical paroxysms was, in the large majority of cases which I have witnessed and investigated, apparently brought on by some physical exertion. This is the most important circumstance. The importance of it arises from the

following considerations:—When the uterus is in a state of flexion, either forward or backward, the act of lifting, or stooping, or over-walking, or standing, has the effect of intensifying the flexion; the uterus is pushed lower in the pelvis, and its curvature becomes exaggerated. This is a fact abundantly borne out by clinical observation. The result of increase of the flexion of the uterus is to increase the congestion; there is in such cases congestion to begin with, but the physical exertion leads to its very considerable aggravation, and when the aggravation reaches a certain point the hysterical attack appears.

On the other hand, by taking measures such as are adapted to prevent the aggravation of an existing flexion—that is to say, by keeping the patient in a horizontal position—the attacks are not found to occur, or, at all events, become much diminished.

Observation shows that the dorsal position prevents hysterical attacks due to anteflexion, but that the prone position is most effective when the case is one of retroflexion. These facts are most interesting. Out of the eighteen cases related, twelve were cases of anteflexion, from which it appears that the most common cause of hysterical attacks is presence of anteflexion of the uterus. One of the principal reasons why the mechanism of the production of the hysterical paroxysm has so long escaped recognition is, I believe, the fact that anteflexion of the uterus has, up to quite a recent period, been hardly allowed a place in nosology. I cannot stay here to explain this latter circumstance; but I take the opportunity of saying that, having for many years closely observed and investigated the mechanical diseases of the uterus, I have long been impressed with the grave nature and frequency of the symptoms to which this variety of distortion and displacement of the uterus is capable of giving rise.

I may be permitted, in conclusion, to make a few remarks on the ovarian theory as to the origin of the attacks, which has of late been so warmly advocated by Professor Charcot.

It is well known to gynaecologists that the ovary is sometimes found to be prolapsed, and can be readily felt in the Douglas' pouch. It is there subjected to great pressure and irritation, and much pain and suffering is found to be present in such cases. These cases would therefore be supposed to be of all other cases

in which hysterical attacks should occur, supposing that the ovaries are the principal point of origin. I do not deny that such dislocation of the ovary may cause hysterical attacks ; but I have, at all events, not seen attacks of hysteria in such cases of dislocated ovary, unless accompanied also by acute anteflexion of the uterus. Retroflexion and dislocation of the ovary are not seldom associated.

Further, in the cases of hysteria above related, where flexion of the uterus was undoubtedly present, the ovaries were not found to be particularly sensitive, nor was there evidence of ovarian disease.

The fact that pain is frequently felt in the ovarian region in cases of hysteria, on which much stress has been laid by those who adopt the ovarian theory, is explained by the flexion of the uterus. Having made many observations on this subject, I am able to state that pain in the ovarian region is a very common symptom in cases of uterine flexion. It appears to be due to the fact that the flexion is generally a little to one side, the uterus not being usually bent directly backwards or forwards, but most usually a little to one side or the other.

Two series of facts described by Professor Charcot are adduced by him to support the theory that the ovary is the *point de départ* of the paroxysm in hysteria and hystero-epilepsy.

In the first place, Charcot states that pressure over the lateral hypogastric region has the following effect :—" Pressure there produces not only pain, but a sensation accompanied by all or some of the phenomena of the aura hysterica. Thus, methodical compression of the ovary determines the production of the aura, or sometimes even a perfect hysterical seizure."

In the next place, Charcot states that a more energetic compression is capable of stopping the development of the attack, when beginning, or even of cutting it short when the evolution of the convulsive accidents is more or less advanced.

The method adopted by Professor Charcot to effect the more severe compression is as follows :—

" The patient should be horizontal in dorsal decubitus on the floor, or a mattress. The physician then kneeling on one knee, presses the closed hand, or fist, into that iliac fossa which he had

previously learned to regard as the habitual seat of the ovarian pain. At first much force is required to overcome the abdominal muscles. Pressure then produces numerous and noisy attempts to swallow. Consciousness returns almost at the same time. Now the woman moans and weeps, says she feels relief, or that you are hurting her. By continuing the pressure two, three or four minutes, you are almost certain to find all the phenomena of the seizure to disappear as if by magic. When the abdominal resistance is overcome, pressure by the two first fingers is sufficient."*

It may be desirable to consider how far the results of Professor Charcot obtained by pressure, as above described, over the ovarian region, are antagonistic, or the reverse, to the uterine theory above formulated, as to the cause of the paroxysm in hysteria and hystero-epilepsy.

The pressure employed by Professor Charcot is a very forcible pressure made in the hypogastric lateral region, calculated, first of all, to abolish the resistance of the abdominal muscles—a resistance considerable in many cases; and secondly, to produce a real compressing influence on the organs which lie in the pelvis. The incidence of this pressure, which is effected by the fist, or by an apparatus specially contrived for the purpose, is rather widely spread, and it is such that it must almost of necessity affect not only the ovary, but first the uterus, and secondly the ovary. Doubtless when the resistance of the abdominal muscles is overcome, the pressure can be more particularly pointed on, or directed towards the ovary, or concentrated on this latter organ. But at the same time it is almost inevitable that the uterus should be greatly affected by this pressure, and must receive a considerable portion of it. Considering for a moment the operation of such pressure on the uterus, the effect might be different, according to the position of the uterus at the time. Thus, if the uterus were much anteverted, the result would, or might be, to push it still lower in the pelvis, and to increase the anteversion; but the action of the pressure would be further to express the blood from the uterine vessels, and to diminish any congestion of

* See New Syd. Soc. trans. of Charcot's "Lectures," p. 27.

the organ existing at the time. If the pressure were made directly behind the pubic bone, the effect might, on the other hand, be such as to push the uterus backwards, and, in the next place, to drive the blood out of its tissues. A further effect of the pressure would be, in any case, to diminish the flow of blood to both uterus and ovaries alike, by the general action of the compressing power on the blood of the pelvis.

So far as I am able to judge, therefore, it would appear that the operation termed ovarian compression is really entitled to be denominated "uterine," quite as much, perhaps even more, than it is to be described as ovarian compression.

But this is not all. Professor Charcot states that slight pressure of the kind above described often brings on pain and symptoms of the hysterical aura—that is to say, the attack is capable of being brought on slight pressure, and relieved by severe pressure. All this is quite in unison with the argument which I just advanced, for supposing a version or flexion to exist, the slight pressure above the pubes, such as Charcot describes, would undoubtedly at first intensify the displacement. The slight pressure would temporarily thus so act on the uterus as to induce the attack.

In conclusion, I would express my conviction that the escape from the indefiniteness of view, which up to the present time has characterized the various opinions entertained as to the nature of "hysteria," is to be found in the frank adoption of the term "hysterical" in its most literal sense, and that in the future the uterus will be held to be in the main responsible for those various manifestations and disorders denominated "hysterical."—*Transactions of the International Medical Congress*, 1881.

GENERAL PARALYSIS.* By PHILIP ZENNER, A. M., M.D.

To the majority of physicians, insanity, in many of its aspects, is a sealed book. Their intimate relations with people of all ranks and all grades of intelligence, sharpens their natural powers of

* Read before the Cincinnati Academy of Medicine, October 23, 1882.

discrimination, and enables them to say in this or that case, there is a departure from the normal; there is a degree of mental unsoundness. But, as regards the different types of insanity, their development, modes of manifestation, and pathological substrata, they are usually not informed. Nor can it be demanded of the busy practitioner, that he should possess that special knowledge, whose attainment demands of the specialist years of diligent study, the services of the latter being always at his call. But there is one form of insanity, which attacks the most valuable members of society, able-bodied, hard-working, intelligent men, which comes on insidiously, and threatens the deepest interests of the family and society, that every physician should know, and know well. It is that usually termed general paralysis of the insane, or dementia paralytica.

To the intelligent being, there is nothing more interesting than observing the development of intellect; to see it budding in the crowing infant and prattling child, unfolding its powers in the youth whose increasing knowledge and growing mastery over self display his strengthening character, or achieving its wonderful conquests in the realms of industry, science or art in the adult man. But the study of this disease brings before us quite an opposite development. We will have to do with the decay, the saddest chapter in the history of intellect. In its retrograde course, it will not infrequently remind us of the intellectual status of the infant and the child.

Within the limits of a brief article, we will necessarily be enabled to do but partial justice to our subject. Many points we must pass in complete silence. Some, even of importance, can be barely mentioned. Again, others we will try to enter into fully, especially such as are of great practical value, or whose thorough comprehension may be necessary for a proper understanding of the disease.

General paralysis is essentially an affection of the anterior portion of the cerebrum, of that part which the study of comparative anatomy and anthropology indicates to be the seat of intelligence, and which modern experimental investigations indicate to contain the motor centers. And it is morbid manifestations of intelligence and of the motor functions, occurring simultaneously

and progressing co-relatively, that constitute the essential features of this disease.

The pathological anatomy consists of changes in the membranes of the brain, usually most marked in the anterior portions, and changes in the cortex and subcortical regions, affecting chiefly the anterior cerebral convolutions. The minute changes in the brain substance are still matters of controversy. In this place, where we wish to enter into important practical considerations only, we will not complicate our study with the many theories and facts in this relation, but content ourselves with the knowledge that the result of the pathological processes is atrophy of the brain.*

With the question of causation we will also be brief. The disease occurs chiefly in men, only in adults, and at the prime of life. Hereditary influences, or other predisposition to cerebral disease, as former disease or structural defect, seem here to play little or no part. It appears to be caused directly by the injurious influences with which one has to contend in the struggle for existence. We find the disease usually in those who have just been performing unusually prolonged and difficult intellectual work. But, as mental overwork scarcely ever has that disastrous influence exerted by passion or other undue strain of the affective life, so we can seldom, if ever, attribute the production of the disease to intellectual strain alone; but will find also a history of unusual excitement, of anxiety, or, perhaps most frequently, of great disappointments. In proof of the overwhelming weight of these factors, the disease is especially rife after great financial crises or political revolutions. The importance and frequency of these causes are universally recognized. Some believe that alcoholism, excessive venery and syphilis (?) are frequently causes of the disease. It occurs with different degrees of frequency in different nationalities. In the highlands of Scotland and Ireland its

* In advanced stages of the disease, the atrophy is very apparent. Meynert has further established, by weighing separate portions of the brain in a large number of instances, that the atrophy is most marked in the anterior cerebral convolutions. The pathological processes that lead to such atrophy are still subjects of discussion, and far from being established. We will mention two of the most plausible theories. The first, that of Lubinoff, is that there is primarily a hyperemia, due to disturbances of the sympathetic nervous system, this hyperemia causing a mechanical obstruction to the lymph circulation, and thence leading to further changes. There is much that speaks for the correctness of this view. The second theory referred to is that the disease is an interstitial encephalitis.

occurrence is rare. Steinen declared that it is hardly known in Java. Its frequency has been ascertained in some colored races. Altogether, it can scarcely be doubted that it is most frequently found in the most highly civilized countries, just as it is most frequently found in highly intellectual individuals.*

We come now to the symptomatology, the most important part of our subject.

He who has previously been active and diligent in his business transactions, is observed to become listless in his manner, and careless of his affairs. Instead of going to his place of business, he lies listlessly about the house, or he appears to be absent-minded, forgets his hat and cane, or perhaps takes an entirely purposeless drive. It is usually said that at this time his memory is already weaker, as he cannot recall the events of the day, can not tell what he has just eaten at a meal, etc. But we would little comprehend his mental condition, should we attribute such occurrences to mere impairment of memory. The latter, as ordinarily understood, is as yet unaffected. The events of a past time can be as readily recalled as ever before. It is only of present occurrences that he takes little cognizance and has no recollection. It is because his power of attention is beginning to fail, that he notices only slightly things about him, and therefore does not remember them. In this disease, the highest faculties of intellect are first to fail. Memory can scarcely be called one of its highest faculties. See the many gifted men with but ordinary memories, and occasionally a but poorly gifted individual with marvellous powers of recollection. But the powers of attention, concentration, abstraction, are most marked in the highest intellects, and when the mind is in its best condition. Our patient, in whom these higher attributes are failing, is in the condition of a day dreamer. He but follows the association of ideas as they uncontrolledly flit through his consciousness. He has lost the power of attention which brings things singly into consciousness, and makes them to be easily remembered.

With the failure of the power of attention is early associated

* In a paper read at the last International Medical Congress, on the "Race Relationship of General Paralysis," the author suggests that the use of the potato for a diet is perhaps the cause of the infrequency of the disease in Ireland!

an impairment of the judgment. He mismanages his business. He entertains senseless projects. And soon those delusions begin to appear, which, to the laity, have always been the most noticeable and marvellous features of this disease, which the French have termed *délire des grandeurs*, the delirium of grandeur. Faint indications of this kind may be early detected, but the outspoken delusions are only present when the judgment is entirely in abeyance. At this time, anything that is desirable seems possible to him. If the patient be a female, delusions are most likely to be on the subject of dress. Though she be attired in rags, she speaks proudly of her silks and satins, of her jewels and precious stones. In man, the delusions are usually of riches, of power or glory. In his squalid den he gratuitously dispenses millions, and proclaims himself a prince or a sovereign. And, further, on account of his low state of intellectuality, his delusions are constantly changing.

The grandiose character of the delusions of this disease has been attributed to irritation of the cortical hemispheres. But, it seems to me, an explanation based upon psychological data would be clearer, and, perhaps, more correct.

In the great majority of cases, a feeling of elation and well being is dominant during the whole course of the disease. The patient never has any feeling of illness, but seems to overflow with a sense of health and power. Hutchinson has well insisted upon the fact that temperament is usually but the expression of the state of physical health or bodily comfort. In cases of strutting health, with the prevailing feeling of well-being, we will ordinarily find a sanguine temperament, while a melancholic is perhaps the result of past disease or present suffering. Nowhere else, so much as in general paralysis, does this feeling of physical health so domineer every thought and utterance. It renders the disposition an exceedingly joyous one, and it makes of every vagrant fancy an uttered delusion. The infant, with its sense of muscular power, stretches his hand toward the moon in order to grasp it. The paralytic, who has scarcely more judgment than the infant, and whose weakened intellect, unobservant of external things, dwells only on the *ego*, in his sense of health and power

believes everything belongs to him, that everything is possible to him.

But in the later stages of the disease, when a smile or laughing face is nearly always present, and the most absurd delusions the only utterance, we must not suppose these to express an active joyousness or ambitious projects. He has arrived at that stage where life is scarcely more than animal life, and actions and words scarcely more than reflex actions. We have all seen how happy a mother is when she for the first time sees her infant's smile in response to her own. She thinks she sees a happy soul behind that smile, and knows not that it was merely the reflex of her own act. In our patient, in this last stage of the disease, his smile scarcely expresses a deeper feeling than the infant's. His face is only a mirror of what is passing about him. If you smile before him, his face broadens in laughter; if you assume a mournful countenance, he breaks into tears. His uttered delusions are but the remembered words and phrases of a former life.

Coincident with the impairment of the intellect, the emotions and the will become equally affected. As the power of observing external things and the judgment become weaker, the higher kinds of feeling, those which give tone to our character, the æsthetic, the ethical, etc., become fainter, and only the lower, the transitory, those excited by sensuous perceptions, arise in the consciousness. The will yields equally. Actions become impulsive, responding to the fleeting emotions, the controlling influences, which give their determined and purposive character, being lost. We can thus easily account for the impulsive and irresponsible actions of the paralytic, and have only to add that the intensity of his emotions and the energy of his actions have also become much enfeebled.

We have now reviewed the general changes in the intellect and character of the paralytic in their general decay. We have attempted to view them from the higher standpoint of their psychological causes, as learned from the natural development and decay of mind. We have given no full description of his mental condition; of the many delusions he may entertain; of the mental weakness displayed, as much in the easy manner in

which he is diverted from his schemes, as in the schemes themselves; in his utter incapacity to judge of the acts and motives of others, as well as his own, and, further, of his defective moral sensibility, and of his apparently motiveless actions. We cannot pretend to give a full description of this ever-varying picture. To do that it would be necessary to mention all the possible conclusions of a weakening judgment, all the feelings of a narrowed egotistical existence, and all the actions of a wavering mind. But, where it exists, the competent observer will be able to recognize the picture of mental weakness. For he, who has learned to know the springs of human actions, who knows something of the capabilities of the human mind, will be able to judge whether the performances of the individual correspond to the ability with which he has been hitherto credited, whether his actions are prompted by such motives as in a normal mind.

We come now to the second set of symptoms, the motor phenomena of this disease. These are of great interest for they recall and corroborate facts gained by experimental investigation. The paralyses are cortical in their origin. Experiment has shown that cortical lesions leave but very slight paralyses, which are chiefly manifested in complex movements. This is the exact character of the paralyses of this disease. They are mostly not readily observable, and are brought out by complex movements requiring the delicate play of muscles. The paralyses usually observed are those of the facial muscles, dilatation of the pupil (usually on the same side as affection of the facial, and that generally on the right side), and tremor of the lips and tongue. Of these we will again speak when on the subject of diagnosis.

We have said that the above are the usual paralytic manifestations of general paralysis. We might add they are in the great majority of cases the only paralyses due to the cerebral lesions. But—and here we are approaching the most inexplicable part of our subject—in very many cases of this disease there are spinal as well as cerebral lesions. It is a striking fact that in the most common of the organic diseases of the cord, locomotor ataxy, cerebral symptoms due to lesions of the optic, third, sixth, and other nerves are often present, and in this, the most common organic disease of the brain, spinal lesions are frequently found.

For the connection of the spinal with the cerebral disease, as in the other case the appearance of the cerebral symptoms with spinal disease, there has as yet been no satisfactory explanation.*

The spinal symptoms are mainly those of paraplegia. The impaired gait may be like that of lotomotor ataxy, due to incoordination of movements, or the spastic gait of spastic spinal paralysis, or merely a weakness of the muscles not characterized by either of the above types. The pathological anatomy is sometimes that of typical locomotor ataxy, sclerosis of the posterior columns. Sometimes myelitis of the antero-lateral columns.† In cases with the symptoms and pathological changes of locomotor ataxy, the cerebral symptoms of that disease, myosis, paralysis of the ocular muscles, etc., are often present.

The spinal symptoms may precede those of mental derangement, but more frequently they occur later. Westphal, who discovered that the absence of the patellar tendon reflex is nearly always a sign of disease of the posterior columns of the cord, has enabled us to detect spinal lesions even when the symptoms of such disease are not present. He has thereby been enabled to determine that spinal disease occurs more frequently in general paralysis than is usually supposed, and has proved on the post-mortem table the correctness of the diagnosis of spinal disease where, during life, there was no spinal symptom.

Before concluding the subject of symptomatology we will mention a few facts, exceedingly important in themselves, but of which our limited time will allow but the mere mention : that is the occasional occurrence of epileptic or apoplectic attacks, and the not infrequent outbreak of acute maniacal excitement.

* The explanation that when the posterior fasciculi are affected, there has been ascending disease from the cord, when the lateral columns are affected, descending disease from the brain to the cord, is not tenable. There has been no anatomical evidence of such a continuity of disease, and clinical histories are often not in accordance with such a development.

† In the last number of the *Archiv für Psychiatrie und Nervenkrankheiten*, Zachler reported a case with the ordinary manifestations of what has been termed spastic spinal paralysis, paresis, muscular rigidity, exaggerated tendon reflexes, etc., in the lower extremities, in which he found no changes in the cord. Hence, he has claimed that these symptoms may be due to cerebral rather than spinal diseases. Although the set of symptoms just mentioned which Erb and Charcot have attributed to disease of the pyramidal tracts in the cord have not yet with certainty been associated with any exact pathological changes, yet in the great majority of such cases, where post-mortem examinations have been made, very decided spinal lesions have been found. So that, notwithstanding the above mentioned case, I believe, we need not hesitate to assign that complex of symptoms to spinal, and not cerebral lesions.

The occurrence of peculiar disturbances of vision, first noted by Fürstner, and since then by a few others, and the efforts to bring them in relation with certain changes in the cortex, have an interest for the physiologist, rather than any clinical importance.

We just now enter into that part of our subject, practically so important, the diagnosis of the disease.

When the patient has become a maniac, when his speech consists of mere utterances of his delusions which amuse even a child, the physician is no longer called upon for a diagnosis, though even then mistakes of a kind to be later mentioned are sometimes made. The family no longer needs his advice to avert financial ruin or personal calamity, and the patient has probably been removed for safe keeping to the asylum of the alienist. It is in the inception of the disease when the weakening judgment, the germinating delusions of the one still considered by society as a responsible agent is leading him into ruinous enterprises and senseless extravagancies, possibly to be attended by an outbreak of madness which threatens human life, that the ready perception of the physician, a correct diagnosis proves of inestimable value. And at this time a correct diagnosis is peculiarly difficult.

In the beginning the changes are usually slight such as are only noticeable to those intimately acquainted with the patient. There may be some change in his disposition, but what is especially noticeable is that he does not observe and take interest in things as before, neglects his own affairs. Already there is some impairment of the intellectual faculties. But the examiner must be pardoned if he cannot yet detect a slight defect in one whose mental powers equal, and possibly surpass, his own ; for, as we have already stated, it is the gifted, the intellectual, who are most frequently affected. At least the practitioner will require all his acuteness to enable him to form a correct estimate of the mental condition of his patient at this time. He must rely partly on those who know the patient intimately, as to changes in his mental status. He must observe whether there is an apparent spirit of boastfulness, not formerly present (the first indication of the delirium of grandeur) ; try to determine

whether the patient can perform higher intellectual tasks, mathematical, conversational, etc., as well as before, test patient's memory and reasoning powers, in short, test patient's intellect in every possible direction. If the disease be already well advanced his task will be easy, in the beginning it may be beyond his power. At the same time he must look for motor symptoms, differences in the pupils, paresis of facial muscles, tremor of lips and tongue, or difficulties of speech.

If these and the mental symptom are observed (and fortunately for the diagnosis the two, even in the beginning, are usually found together) the diagnosis, even in the inception of the disease, is established with a high degree of certainty.

The paralytic symptoms, as before mentioned, are very slight and may be difficult to detect. If you will permit we will dwell briefly on the best methods of making such slight manifestations cognizable. To detect slight differences in the pupils let patient look at some surface evenly lighted, as the whitened ceiling, and the observer stand in such a position as not to shade either eye. If the facial paralysis is not observed in the drooping of one corner of the mouth, or the less prominence of the naso-labial fold on one side where the face is in a state of rest, slight changes of this kind may become more distinct after the patient has spoken for some time; or may be made apparent through his squeezing the hand of the physician, when the involuntary facial expression thus elicited will reveal slight differences in the muscular innervation of the two sides of the face.

The ordinary modes of detecting facial paralysis, by the patient exposing his teeth or laughing, are such coarse movements that they conceal rather than reveal the slight motor defects. The tremor of the lips and tongue can also be best detected after the patient has been speaking for some time.

But the best test of slight changes in the speech-making organs, and one of the most reliable of the diagnostic symptoms, is the affection of speech. We do not find the scanning speech so characteristic of multiple sclerosis, but one of a different character. There is a kind of stumbling in his articulation. Words are brought out with difficulty, and are frequently cut short, letters or entire syllables being clipped off.

We repeat, such slight paralyses are characteristic of general paralysis. Only at a late period does the tremor of lips and tongue sometimes become excessive, the speech become altogether unarticulate, or the facial paralysis very decided. As regards the other motor symptoms, of spinal origin, they will seldom aid us to make a diagnosis of general paralysis.

Let us consider the distinctive character of the delusions of this disease. The *délire des grandeurs* occurs in other kinds of insanity, but there is something distinctive of it as here manifested. In other forms of insanity, where the delusions of greatness are present (excepting in some forms of dementia, kindred to general paralysis, to which we will later refer) the delusions have a certain logical basis, and are more or less permanently in one form. If one believes himself to be a prince, that delusion is based upon some erroneous conceptions, which have become a part of his mental existence, and will remain steadfastly with him. But in our case, as already stated, those delusions result from an entire absence of judgment. They are the mere expression of a vagrant fancy. They are characterized by their senselessness and their variability.

Complications which may make the disease difficult of recognition are the occurrence of apoplectic or epileptic seizures, or an outbreak of acute mania. Sometimes the disease is ushered in by one of these conditions. In that case a diagnosis is, as yet, impossible (though in some cases, even during the period of maniacal excitement, indications of mental weakness or the presence of the peculiar paralysis will reveal the true condition.) If such a complication occurs during the course of the disease the diagnosis must be based on the previous history.

We must now speak of the diagnosis of the fully developed disease. First in importance and frequency, among the diseases which may be confounded with it, is alcoholism. Chronic alcoholism may produce all the symptoms of general paralysis. Or the two diseases are not infrequently present at the same time. In cases of chronic alcoholism with symptoms of general paralysis we must abide by the rule so often imposed upon us in obscure cases, that is, allow of a certain lapse of time before making a diagnosis. The importance of this rule in such cases cannot be

over estimated. For want of it mistakes are only too frequently made.

A second class of cases which may be mistaken for general paralysis is that where coarse lesions of the brain, most frequently due to haemorrhage or embolism, are followed by dementia. In such the paralyses are usually more decided than in general paralyses, and point to a focal lesion. But the history will settle the diagnosis.

There is another class of cases, but a very rare one, in which a correct diagnosis is far more difficult; that is, cases of localized meningitis (usually primarily pachymeningitis, perhaps haemorrhagic) occurring especially in the neighborhood of the central convolutions. That cases of this kind are often classed under general paralysis cannot be doubted. The diagnosis is often impossible. The course of the disease will alone (but not always) be able to clear it.

Lastly, we will only mention multiple sclerosis and cerebral syphilis, instances of which diseases being sometimes exceedingly difficult to distinguish from general paralysis. We must look for special symptoms of these diseases, and if these will not determine their character, we must again rely upon the course of the disease.

We have frequently mentioned the "course of the disease." This is clinically of the greatest importance. We know the disease rather by its course than its symptoms. The symptoms may be found in various other conditions, but the disease has a particular course peculiar to itself. Its average duration is three years. It almost invariably terminates fatally. Its duration is usually longer in woman than in man, longer in cases of a melancholic type than in others; and in some cases in which there are periods of improvement or apparent recovery its duration is indefinite. There is usually a gradual progress in all the symptoms, mental and motor, from bad to worse. Sometimes there are sudden and rapid changes, as an apoplectic attack followed by a considerable increase of the dementia; sometimes an improvement of indefinite duration. Death is sometimes caused by a gradual failing of all the bodily functions; more frequently it

is caused by an apoplectic attack, decubitus, pneumonia, tuberculosis, or disease of the bladder or kidneys.

In the preceding description we have given the symptoms of the usual or classical type of the disease. Other symptoms may be present, producing quite a different appearance from the ordinary picture. Sometimes instead of the usual slow manner of thinking and acting, there is a very flood of ideas, an unusual vivacity in thought and manner. Not infrequently there are outbreaks of maniacal excitement, when, it must never be forgotten, the patient becomes dangerous to his surroundings. Again we meet with conditions of mental depression. There are cases in which a depressed hypochondriacal state of mind marks the whole duration of the disease. In some instances delusions, usually so characteristic of this disease, are never detected. Hallucinations may or may not be apparent in a particular case. Spasmodic muscular affections complicate the history in some instances.

And so we might add other symptoms which give peculiar appearances in certain cases. But, and this is the important part which cannot be too much emphasized, whatever the clinical manifestation presented, the diagnosis is based upon the impairment of the intellectual faculties, and the peculiar paralyses, and is confirmed by the course of the disease.

The following cases are very briefly described to illustrate the preceding remarks. Cases illustrative of the incipient stages of the disease would be more valuable, but the material is lacking. For the opportunity to examine these patients and their histories, I am indebted to Dr. Harmon, of Longview Asylum :

T. D., age thirty-four, bank clerk; duration of disease, two years; excessive venery, also addicted to excessive use of alcohol. The first history of mental disorder is that of delusions of various kinds. His speech was soon observed to be slow and hesitating, his talk foolish, did not recognize his surroundings, believed himself to be in a barracks. Habits filthy.

At the end of eighteen months he had an attack of durable hemiplegia. Since then more pronounced delusions, especially of wealth.

Present condition. Secondary contractions and rigidity of

muscles of right arm and leg. Facial paralysis on the right side. Right pupil larger than the left. Tongue tremulous. Speech indistinct. Mind almost a blank.

In this case the diagnosis is based on the history. The dementia is the only symptom present pointing directly to general paralysis. The high degree of paralysis would, were it not for the history, lead us to exclude this disease. It is one of these rare cases in which an attack of hemiplegia, occurring in the course of this disease, is durable. The subsequent contractures lead to the inference that the disease has been complicated with a cerebral haemorrhage. Yet purely cortical lesions have appeared in some cases to produce secondary degeneration of the pyramidal tracts, with subsequent rigidity of the paralyzed muscles. We will again call attention to the fact that the mental condition became rapidly worse after the attack of hemiplegia.

G. R., age thirty-five, farmer, married; duration ten years; cause unknown. In the beginning it was noticed that his actions appeared to be aimless, that he appeared to be always contented and happy, was always smiling. Soon observed delusions of wealth, also tremulousness of lips and tongue, and difficulty of speech.

Present condition. Paresis of facial muscles on the right side. Tremor of lips, tongue, and hands. Gait feeble. Can obtain no utterance from him. He appears to be entirely demented.

In this case there is the typical history, but the complete silence, and the absence of every facial expression, are unusual in this disease. We can only account for them by supposing complete dementia.—*Journal of Psychological Medicine.*

REPORT UPON A SPECIMEN OF XANTHIC OXIDE CALCULUS.

By W. W. KEEN, M. D., Surgeon to St. Mary's Hospital.
[Read December 6, 1882.]

I desire to present for Dr. George L. Porter, of Bridgeport, Conn., a specimen of xanthic oxide calculus. It consists of one-half of a stone, an inch and a half long and an inch wide. This half is to be deposited in the Museum of the Jefferson Medical

College, the other half is in the Army Medical Museum, Washington, D.C.

So rare is this calculus that, including the present specimen, only eight have ever been described, and none of them so completely as Dr. Porter's. Moreover, this is the only specimen ever recognized and described by an American surgeon. Four of the specimens are British, two French, and one German. Maracet in 1877 described the first calculus of this kind which was recognized.

The present stone was passed spontaneously by a woman eighteen years old. Its clinical history presents nothing specially worthy of note, but its chemical constitution makes it very interesting. Xanthine or xanthic oxide is analogous to uric acid, having, however, one less equivalent of oxygen, and is the rarest of all calculi. In the *New England Medical Monthly* for May, 1882, Dr. Porter relates the case in full, with a drawing of the stone, and an analysis and comparison of the eight cases on record and some interesting remarks on xanthic oxide itself.

[After the reading of the preceding paper :—]

Dr. JOHN B. ROBERTS stated that in 1873, Dr. R. J. Levis operated for vesical calculus by lithotripsy on a man. The patient, who was 69 years, was an inmate of the Pennsylvania Hospital. The fragments were examined by the late Dr. H. B. Hare, the well-known pathological chemist, and found to consist of xanthic oxide. The patient was discharged by request of his friends, while some of the stone still remained in the bladder, and passed from the surgeon's observation.

Dr. JAMES TYSON said that in connection with the case just reported by Dr. Keen, he desired to place on record a case which came under his own observation, of persistent cystin sediment in urine, concurrent with impacted oxalate of lime calculus. G. B. W., a very intelligent physician residing in one of the southern counties of Pennsylvania, and 45 years of age when he first saw him, was lithotomized in Baltimore when he was 28 years old, and a calculus of pure cystin removed. From that time he continued, according to his own account, to pass cystin daily. Early in January, 1879, a specimen of urine was sent to Dr. Tyson in which there was considerable pus and a proportionate amount of

albumen. In this specimen there was found no cystin, but in later specimens there were found large numbers of the characteristic crystals along with pus and albumen. A little later Dr. Tyson visited him at his home, and found him suffering greatly with extreme lumbar pain, attacks like which he had frequently had before, but the present one was of unusual duration, and had greatly prostrated him. There seemed every reason to believe that there was a calculus impacted somewhere between the left kidney and the bladder. His sufferings continued, and he was only relieved by death, which occurred on the 6th of March, 1879.

The following notes of the autopsy were received from Dr. Wm. B. Rowland of Rowlandsburg, Md.: The post-mortem examination revealed calculus in the left ureter just ready to pass into the bladder. The calculus was the size of a large pea, and very rough. Just behind where the calculus was found in the ureter was a collection of pus, dipping down into the pelvis, which would soon have made its exit through the ischiatic foramen if life had been prolonged.

The left kidney was somewhat enlarged, and the right was not more than one-fifth the usual size, but apparently healthy. The bladder, stomach, and bowels were healthy. No mention was made by Dr. Rowland of the liver, which was presumably healthy, but there was found in the gall-bladder a calculus an inch long and half an inch in diameter throughout its length.

The calculus which is exhibited to the College presented none of the physical and chemical characters of cystic calculi, which are smooth and friable, but is evidently oxalate of lime. This is particularly interesting in view of the fact that a cystin calculus was removed by lithotomy seventeen years earlier, and that the patient so persistently passed cystin crystals up to the time of his death.

A NEW SYMPTOM IN CEREBRAL DISEASE.—“In certain morbid conditions,” says M. Parrot, “if one pinches the skin smartly, the pupil will be seen to dilate.” After detailing two series of cases (in one set of which this symptom was present and in the other absent), he considers the mode of production of

the symptom, and he arrives at the opinion that it is not the result of contraction of the radiating fibers through the influence of the sympathetic nerve—this would, in his opinion, be insufficient to overcome the antagonism of the constricting or circular fibers,—but that it results from vascular depletion of the iris owing to constriction of its vessels. In support of this view he reminds us of an observation of Kussmaul's, that the pupil dilates during inspiration and contracts during expiration. According to Parrot the following would be the order of events: irritation of the skin by the pinch, transfer of this irritation to the medullary center by the sensory nerves, its reflection thence to the vaso-constrictors of the iris, depletion of its vessels, dilatation of the pupil. An essential factor in the production of this symptom would be the retention of cutaneous sensibility. In the second series of cases, where this symptom was not present, cutaneous sensibility was nearly, if not quite, lost. He arrives at the following conclusions:—In certain affections of early infancy, with or without convulsions, with or without appreciable lesions of brain, the patient being in a state of persistent coma, if one pinches the skin, a momentary dilatation of the pupil to even two or three times its previous size is produced. Of these affections, those which are characterized by obvious lesion of the nerve-centers are tubercular meningitis, haemorrhage into the pia mater, certain cases of chronic hydrocephalus, and, lastly, certain ill-defined conditions in which the volume of the brain encroaches upon the cranial capacity. On the other hand, in other morbid states, mostly without convulsions but with coma, the pupil much contracted undergoes no change even when one pinches the skin with sufficient force to produce movement of the face and limbs. In these patients sometimes there exists no appreciable lesion of the nerve centers; at other times there may be oedema or marked congestion; but in neither case is there any cerebral compression. So far, the only practical conclusion one can draw from this group of facts is the following: a child (affected or not with convulsions) who is comatose, and whose pupils do not dilate when the skin is pinched, is not suffering from meningitis or haemorrhage into the pia mater, but death is imminent.—(*Revue de Médecine and Med. Times and Gaz.* Oct. 1882.)

Items.

**OFFICIAL LIST OF CHANGES OF STATIONS AND DUTIES OF
MEDICAL OFFICERS OF THE U. S. MARINE-HOSPITAL SERVICE,
OCTOBER 1ST. TO DECEMBER 31ST. 1882.**

BAILHACHE, P. H., Surgeon. Present detail continued until further orders, October 6, 1882. To proceed to Louisville, Ky., as inspector, October 13, 1882. Granted leave of absence for thirty days, November 10, 1882.

VANSANT, John, Surgeon. Granted leave of absence for twenty days, November 18, 1882.

HUTTON, W. H. H., Surgeon. To proceed to Louisville, Ky., and assume charge of the Service, October 7 and 14, 1882.

MILLER, T. W., Surgeon. To continue at present station until further orders, October 6, 1882.

WYMAN, Walter. To inspect keepers and crews of the Life Saving Service, October 5, 1882.

LONG, W. H., Surgeon. To proceed to Detroit, Mich., and assume charge of the Service, October 7 and 14, 1882.

MURRAY, R. D., Surgeon. Having returned from service in the yellow-fever epidemic in Texas, to report in person to the Surgeon General, M. H. S., December 4, 1882. Granted leave of absence until February 28, 1883, December 19, 1882.

FESSENDEN, C. S. D., Surgeon. To proceed to St. Louis, Mo., and assume charge of the Service, October 7, 1882.

PURVIANCE, George, Surgeon. To inspect keepers and crews of the Life Saving Service, October 21, 1882.

SAWTELLE, H. W., Surgeon. To proceed to New York, N. Y., and assume charge of the Service, October 7, 1882.

AUSTIN, H. W., Surgeon. To inspect keepers and crews of the Life Saving Service, October 5, 1882.

FISHER, J. C., Passed Assistant Surgeon. Present detail continued until further orders, October 6, 1882. To proceed to Alexandria, Va., as inspector, October 21, 1882.

HEATH, W. H., Passed Assistant Surgeon. Granted leave of absence for fourteen days, December 28, 1882.

PORTER, F. D., Passed Assistant Surgeon. To inspect keepers and crews of the Life Saving Service, October 5, 1882. To proceed to Evansville, Ind., for temporary duty, November 21, 1882. To proceed to Charleston, S. C., and assume charge of the Service, December 21, 1882.

O'CONNOR, F. J., Assistant Surgeon. To proceed to Norfolk, Va., for temporary duty, October 14, 1882. To rejoin his station (Detroit), November 4, 1882.

WHEELER, W. A., Assistant Surgeon. Relieved of duty at Charleston, S. C., and placed on waiting orders, December 22, 1882.

ARMSTRONG, S. T., Assistant Surgeon. To examine keepers and crews of the Life Saving Service, October 5, 1882.

BENNETT, P. H., Assistant Surgeon. To examine keepers and crews of the Life Saving Service, October 5, 1882.

AMES, R. P. M., Assistant Surgeon. Granted leave of absence for twenty-one days, November 23, 1882.

DEVAN, S. C., Assistant Surgeon. To examine keepers and crews of the Life Saving Service, October 13, 1882. To inspect unserviceable property at the San Francisco Marine Hospital, October 20, 1882.

KALLOCH, P. C., Assistant Surgeon. To inspect keepers and crews of the Life Saving Service, October 5, 1882.

CORRECTION.—Owing to an unfortunate error in the January number, the following selected articles appeared without proper credit to our exchanges in which they originally appeared:

“Locomotor Ataxia, Case,” by A. M. Carpenter, from the *Indiana Med. Reporter*.

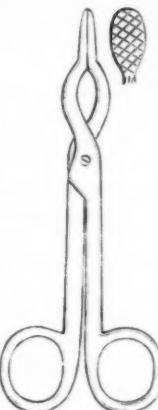
- "The Bradshawe Lecture," by Sir James Paget.
 "Abdominal Section," by J. Ewing Mears, Philadelphia.
 "Notes on Thérapeutics," by R. L. MacDonnell, Montreal.
 "Self-Limited Duration of Pulmonary Phthisis," by Austin Flint, N. Y.
 "Puerperal Fever," by John Lowe, Litchfield, Eng.
 "Dry Cupping and Rest in Locomotor Ataxia," H. M. Lyman.

DEFLECTED SEPTUM NARIUM. — For the relief of this unpleasant deformity, after trying various other methods, I have lately practiced the following operation :

I make a crucial incision through the septum, one line of which is longitudinal, the other transverse. These incisions are made with the utmost obliquity practicable, so that the four quadrants imbricate upon one another, thus permitting them to easily override one another when the deflection is rectified.

The rectification may be effected with a pair of ordinary polypus forceps; but I have had constructed for this purpose a pair after the accompanying sketch.

After rectification, I insert into the heretofore occluded nostril a rubber tube of the required size, which is worn for two or three weeks.



MOSES GUNN.

TO MEDICAL SOCIETIES. — Secretaries of Medical Societies in the State of Illinois are requested to forward lists of the officers and members of such societies, with post-office addresses, to the Secretary of the State Board Health at Springfield. These lists are needed to facilitate the distribution of the publications of the Board and for other purposes.

CHICAGO MEDICAL COLLEGES. — The winter sessions of the various medical colleges will soon close. They have all had a winter of great prosperity, and the large classes demonstrate the importance of Chicago as a medical center.

CLINICS.

MONDAY.

- Eye and Ear Infirmary**—1.15 to 2.15 p. m., Otological, by Dr. Schaefer; 2.15 to 3.30 p. m., Ophthalmological, Dr. Holmes.
Mercy Hospital—2 p. m., Medical, Profs. Hollister and Quine.
Rush Medical College—3 p. m., Dermatological and Venereal, by Prof. Hyde.
Woman's Medical College—2 p. m., Dermatological and Venereal, by Prof. Maynard.

TUESDAY.

- Cook Co. Hospital**—2 to 4 p. m., Medical and Surgical Clinics.
Mercy Hospital—2 p. m., Surgical Clinic, by Prof. Andrews.
Woman's Medical College—10 a. m., Prof. Ingals.

WEDNESDAY.

- Chicago Medical College**—2 p. m., Eye and Ear, by Prof. Jones.
Rush Medical College—2 p. m., Medical by Prof. Bridge; 3 p. m., Ophthalmological and Otological, by Prof. Holmes; 3 to 4 p. m., Diseases of the Chest, by Prof. Ross.
Woman's Medical College—2 p. m., Eye and Ear, by Dr. W. T. Montgomery; 3 p. m., Diseases of Children, by Prof. Chas. W. Earle.
Eye and Ear Infirmary—2.30 p. m., Dr. E. J. Gardiner.

THURSDAY.

- Chicago Medical College**—2 p. m., Gynæcological, Prof. Dudley.
Rush Medical College—2 p. m., Diseases of Children, by Prof. Knox; 3 p. m., Diseases of the Nervous System, by Prof. Lyman.
Eye and Ear Infirmary—1.15 to 2.25 p. m., Otological, by Dr. Schaefer; 2.15 to 3.30, p. m., Ophthalmological, Dr. Holmes.
Woman's Medical College—3 p. m., Surgical, by Prof. Owens.
College of Physicians and Surgeons—2 p. m., Medical, by Prof. S. A. McWilliams; 3 p. m., Surgical, by Prof. R. L. Rea.

FRIDAY.

- Cook County Hospital**—2 to 4 p. m., Medical and Surgical Clinics.
Mercy Hospital—2 p. m., Medical, by Prof. Davis.

SATURDAY.

- Rush Medical College**—2 p. m., Surgical, by Prof. Gunn.
Mercy Hospital—2 p. m., Surgical Clinic, by Prof. Andrews.
Chicago Medical College—3 p. m., Neurological, Prof. Jewell.
Woman's Medical College—2 p. m., Gynæcological, by Prof. T. D. Fitch.
College of Physicians and Surgeons—2 p. m., Diseases of the Chest, by Prof. S. A. McWilliams; 3 p. m., Gynæcological, by Prof. A. Reeves Jackson.

Daily Clinics, from 2 to 4 p. m., at the Central Free Dispensary, at the South Side Dispensary and at the West Side Dispensary.